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MEMOIRS

OF THE

CALEDONIAN

HORTICULTURAL SOCIETY.

MEMOIRS

OF THE

CALEDONIAN

HORTICULTURAL SOCIETY.

VOLUME THIRD.

EDINBURGH:

PRINTED BY R. NEILL,

FOR ARCHIBALD CONSTABLE & COMPANY, EDINBURGH;

AND HURST, ROBINSON, & CO. LONDON.

1825.

MEMOIRS

OF THE

CALEDONIAN

HORTICULTURAL SOCIETY.

VOLUME THIRD.

——— Deus nobis hæc otia fecit.

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Insere nunc, Melibœe, Pyros; pone ordine Vites.

Virg.

EDINBURGH:

PRINTED BY P. NEILL,

FOR ARCHIBALD CONSTABLE & COMPANY, EDINBURGH,
AND HURST, ROBINSON, & CO. LONDON.

1825.

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LIST OF MEMBERS

OF THE

CALEDONIAN

HORTICULTURAL SOCIETY,

1819.

HONORARY.

Elected December 5. 1809.

His Grace the Duke of Buccleuch and Queensberry.
The Right Hon. the Earl of Wemyss and March.
The Right Hon. Lord Gray, Kinfauns.
The Right Hon. Sir John Sinclair, Bart.
Sir John Hope, Bart. of Pinkie.
Sir William Forbes of Craigievar, Bart.
Francis Garden Campbell, Esq. of Troup.
George Skene, Esq. of Skene and Carriston.
The Right Hon. Sir J. Banks, Bart. P. R. S. Lond.
Richard Anthony Salisbury, Esq. London.
Thomas Andrew Knight, Esq. Downton.

March 6. 1810.

The Right Hon. the Earl of Leven and Melville.
The Right Hon. the Earl of Kintore.
The Right Hon. James Lord Ruthven.
The Hon. William Maule of Panmure, M. P.
Sir James Gordon, Bart. of Gordonstone, Letterfourie.
Alexander Munro, Esq. of Livingstone.
David Black, Esq. of Bandrum, Dunfermline.
William Wemyss, Esq. of Wemyss-Castle, M. P.
Adam Rolland, Esq. advocate.
Charles Christie, Esq. of Durie.

December 4. 1810.

The Hon. Douglas Gordon Halyburton, of Pitcur.
Dr Andrew Graham, Dalkeith.
Dr Walter Graham, Dalkeith.

March 5. 1811.

The Right Hon. Lord Viscount Duncan.

June 5. 1811.

Lieutenant-Colonel Wemyss of Wemyss-Hall.
General Durham of Largo.
Sir Simon Clark, Bart. of Oakhill.
Sir George Buchan Hepburn, Bart. of Smeaton.

September 3. 1811.

John Deas Thomson, Esq. London.

March 10. 1812.

Sir William Rae, Bart. of St Catherine's.

June 9. 1812.

The Most Noble the Marquis of Queensberry.

June 14. 1814.

Sir Gilbert Blane, Bart. M. D. London.
J. C. Curwen, Esq. Worthington Hall.

December 13. 1814.

Sir James Wylie, M. D.
Sir Alex. Crichton, M. D.
Sir Arch. Crichton, M. D.
} Physicians to the Emperor of Russia.

March 8. 1815.

Dr Adam Burt, Bengal.

Dr Francis Buchanan Hamilton, Bengal.

December 5. 1815.

The Right Hon. Lord Dundas of Aske.

Dr Mathew Baillie, Physician to the King.

C. W. Williams Wynne, Esq. M. P.

Augustus Frederick Schweigger, M. D. Professor of Botany at Konigsberg.

March 12. 1816.

P. P. Carnell, Esq. London.

June 11. 1816.

His Royal Highness Prince Leopold of Saxe Cobourg.

September 17. 1816.

Sir William Bagshaw of the Oaks, Derbyshire.

March 11. 1817.

The Right Hon. George Canning, M. P.

June 10. 1817.

The Most Noble the Marquis of Hastings, Governor-General of India.

December 10. 1817.

The Rev. Thomas Wilkinson, M. A. Trin. Coll. Camb. Bulvan Rectory, Essex.

June 9. 1818.

His Royal Highness the Grand Duke of Saxe Weimar.

His Highness the Duc d'Aremberg, Brussels.

John Trevelyan, Esq. of Wallington.

September 8. 1818.

The Right Hon. William Dundas, M. P.

December 8. 1818.

General Sir Robert Blair, Bart. 54

N. B.—By a regulation (8th Dec. 1812) respecting the admission of Members, it was enacted, That the rank of Honorary Member should in future be confined to distinguished amateurs of Horticulture who do not reside in Scotland.—Several of those who were once in the Honorary list, (Sir James Hall, Sir George Mackenzie, Dr Hare and others,) were, at their own desire, transferred to the Ordinary List, that they might be called upon to give an annual contribution for promoting Horticulture in Scotland.

ORDINARY.

ORIGINAL MEMBERS, 1809.

Sir James Hall, Bart. of Dunglass, P. R. S. E.
Sir George Stewart Mackenzie, Bart. of Coul, V.P.R.S.E.
Dr James Hare, of Calderhall.
Dr Andrew Duncan *senior*, Professor of Medicine.
Dr James Home, Professor of Materia Medica.
Dr Daniel Rutherford, Professor of Botany.
Dr Andrew Coventry, Professor of Agriculture.
The Right Hon. Sir Robert Liston, G.C.B. of Millburn-Tower.
George Bruce, Esq. of Langlee.
James Smith, Esq. Leith.
Mr Walter Dickson, Edinburgh.
— Andrew Dickson, Edinburgh.
— Alexander Henderson, Meadowbank.
— Thomas Shade, Edinburgh.
— James Macdonald, Dalkeith Park.
— John Hay, Edinburgh.
— John Fletcher, Merchiston-Bank.
— Edward Sang, Kirkcaldy.
— Charles Norval, Abbot's Hall, Kirkcaldy.
— Patrick Neill, Canonmills, appointed first Secy.

Elected March 6. 1810.

James Gibson, Esq. of Ingliston, W. S.
William Pagan, Esq. of Spittalton.
David Falconar, Esq. of Carlourie.

James Heriot, Esq. of Ramornie.
Henry Jardine, Esq. W. S.
Henry Johnston, Esq. surgeon, Edinburgh.
James Weddell, Esq. Pendreich.
Rear-Admiral Sir David Milne, Inveresk.
Robert Little Gilmour, Esq. W. S.
Walter Berry, Esq. Newington.
George Fulton, Esq. Trinity.
Mr James Dickson.
— George Dickson.
— James Smith, Hopeton House.

December 4. 1810.

Robert Speirs, Esq. of Kirkmay.
Archibald Mackinlay, Esq. Edinburgh.
Mr George Watson, jeweller, Edinburgh.

March 5. 1811.

Hugh Watson, Esq. W. S.

June 5. 1811.

Duncan Cowan, Esq. Edinburgh.
J. A. Higgins, Esq. of Prestonhall and Neuck.
John Macfarlane, Esq. of Kirkton.
Dr John Yule, Edinburgh.

September 3. 1811.

Robert Fergusson of Raith, Esq.
Gilbert Laing Meason of Lindertis, Esq.
Robert Bruce Dundas of Blair, Esq.
George Bell, Esq. surgeon, Edinburgh.
John Thomson, Esq. Edinburgh.
James Stuart, Esq. younger of Dunearn, W. S.
William Inglis Esq. of Middleton, W. S.
J. W. Brougham, Esq. Edinburgh.
David Bridges *junior*, Esq. Edinburgh.

December 3. 1811.

John R. Maitland of Eccles, Esq. M. P.
Alexander Young of Harburn, Esq.
William Braidwood *junior*, Esq. Edinburgh.

March 10. 1812.

Sir John Hamilton Dalrymple, Bart. of Cousland.
Dr Meiklejohn, Professor of Church History.
The Rev. Leslie Moodie, Inveresk.
Francis Anderson, Esq. of Stoneyhill, Musselburgh.
Alexander Cowan, Esq. Melville-Mill.
Robert Dundas, Esq. W. S.
Thomas Guthrie Wright, Esq. W. S.
Thomas Hopkirk, Esq. Dalbeth.
Samuel Paterson, Esq. of Lindseylands.
James Bell, Esq. merchant, Leith.
Robert Morton, Esq. Edinburgh.
Dr John William Watson, Leith.
Mr James Malcolm, Kensington.

June 9. 1812.

The Rev. Dr Walter Fogo Ireland, North Leith.
Colonel Spens of Craigsanquhar.
Archibald Constable, Esq. Edinburgh.
Mr Peter Lawson, seedsman, Edinburgh.
— John Grieve, merchant, Edinburgh.

September 8. 1812.

The Rev. Dr Laurence Adamson, Cupar-Fife.
James Bryce, Esq. surgeon, Edinburgh.
George Gardner, Esq. of the Customs, Edinburgh.
William Henderson, Esq. merchant, Edinburgh.
Mr Alexander Wright, seedsman, Edinburgh.

December 8. 1812.

The Hon. George Abercromby of Tullibody.
Dr James Hare *junior*, of Calderhall.

Fred. Fotheringham, Esq. Commissioner of Excise.
John Borthwick Gilchrist, Esq.
Dr William Farquharson, Edinburgh.
Alexander Henderson, Esq. of Warriston, Banker.
Robert Smith, Esq. Edinburgh.
Robert Johnston, Esq. Edinburgh.
Mr Henry Scott, Edinburgh.
Roger Aytoun, Esq. W. S.
Thomas Trotter, Esq. of Blackford.
Thomas Junor, Esq. writer, Edinburgh.
Dr George Wood, surgeon, Edinburgh.
George Kincaid, Esq. Canongate.
Mr Thomas Crichton, Lauriston.
— John Cormack, seedsman, London.

March 9. 1813.

Henry Erskine, Esq. of Ammondell.
John Wauchope, Esq. of Edmonstone.
Gilbert Innes, Esq. of Stow.
Dr Andrew Duncan *junior*.
Robert Stevenson, Esq. civil engineer.
George Reid, Esq. Ratho Bank.
William Macknight Crawford, Esq.
Major Weir, Drumseugh.
James Wyld, Esq. Leith.
John Anstruther, Esq. of Airdit.
Mr William Forbes, Town Record Office.
Robert Edmonds, Esq. London.
Francis Howden, Esq. jeweller.

June 8. 1813.

James Howison, Esq. Hillend.
George Burnet, Esq. Edinburgh.
James Harvie, Esq. of Brownlee.
Mr William Gillespie, Bangholm.
John Govan, Esq. W. S.

September 14. 1813.

Thomas Bell, Esq. Parkside, Melrose.
Professor George Dunbar, Edinburgh.
George Wauchope, Esq. merchant, Leith.
Mr William Aitchieson, jeweller.
— A. S. Porterfield, at St Bernard's, Edinburgh.

December 14. 1813.

J. Glassford Hopkirk, Esq. W. S.
Dr Gillespie, Leith.
Mr Hugh Ronalds *junior*, seedsman, London.
John Linning, Esq. Stockbridge.
Joseph Gordon, Esq. W. S.
Mr James Milne, founder, Edinburgh.
Thomas Deucher, Esq. Edinburgh.
Lieut. Col. H. V. White of Kaimshill.
Mr John Couper, Dalmeny.
Francis Naldar, Esq. Belleville.

March 8. 1814.

Sir Robert Preston, Bart. of Valleyfield.
Sir Patrick Walker, Knight.
Dr Thomas Charles Hope, Professor of Chemistry.
John Archibald Campbell, Esq. W. S.
Charles Stewart, Esq. of Dalguise.
Alexander Macartney, Esq. Commercial Bank.
James Marshall, Esq. Bank of Scotland.
Mr John Fair, seedsman, London.

June 14. 1814.

John Corse Scott, Esq. of Sinton.
James Stewart, Esq. merchant, Leith.
James Scott, Esq. *Stius*, Leith.
William Taylor, Esq. Queensferry.
Henry Junor, Esq. merchant, Leith.
John Ballantyne, Esq.
William Boyd, Esq. of Hillhouse-field.

Michael Meek, Esq. Sober Northallerton.
Mr Walter Hay, fruiterer, Edinburgh.

September 13. 1814.

William Anderson, Esq. Wester Colinton.
Rev. Dr Alexander Brunton, Edinburgh.
Andrew Weddel, Esq. Leith Links.
William Trotter, Esq. Edinburgh.
Francis Jeffrey, Esq. advocate.
Henry Cockburn, Esq. advocate.
John A. Murray, Esq. advocate.
John Lauder, Esq. merchant, Edinburgh.
R. B. Blyth, Esq. merchant, Edinburgh.
Rev. John Thomson, Duddingston.
James Gray, Esq. St Leonard's Rock.
James Wilson, Esq. Edinburgh.

December 13. 1814.

The Right Hon. Lord Elibank.
Robert Jameson, Esq. Prof. Nat. Hist. Edin.
Dr James Hamilton *junior*, Edinburgh.
Alexander Hutchison, Esq. merchant, Edinburgh.
James Ferguson, Esq. advocate.
James Alexander Stewart, Esq. of Glasserton.
William Gilchrist, Esq. merchant.
John Leven, Esq. W. S.
H. Macdonald Buchanan, Esq. Principal Clerk of Session.
John Mowbray, Esq. W. S.
Mr Robert Brown, Brunstain Mills.
John Young *junior*, Esq. W. S.
Alexander Wood, Esq. advocate.
William Braidwood, Esq. merchant, Edinburgh.
P. Spalding, Esq. Edinburgh.
C. G. S. Menteath, Esq. of Closeburn.
John Clapperton, Esq. merchant.

John Harvey, Esq. W. S.
James Baxter, Esq. W. S.
James Bridges, Esq. W. S.
Mr William Griffith, merchant, Edinburgh.
John Richmond, Esq. Nicolson Square.

March 8. 1815.

James Erskine, Esq. advocate.
David Gillespie, Esq. of Kirkton.
Alexander Murray Guthrie, Esq. of Craigie.
Robert Mowbray, Esq. merchant, Leith.
Alexander Guthrie, Esq. Portobello.
James Baxter, Esq. Portobello.
Robert Scott, Esq. Forth Street, Edinburgh.
John Peat, Esq. writer, Edinburgh.
Mr John Reames, Glasgow.
John Anderson, Esq. Leith Walk.
Charles White, Esq. merchant, Leith.

June 6. 1815.

Andrew Pearson, Esq. of the Excise.
Daniel Ellis, Esq. Edinburgh.
Dr Benjamin Bartlet Buchanan, Edinburgh.

September 5. 1815.

Thomas Bruce, Esq. of Grangemuir.
George Kinnear, Esq. Banker, Edinburgh.
William Bell, Esq. W. S. Edinburgh.
James Mitchell Nicholson, Esq. of Glenbervie.
Mr John Rankine, Leith Walk.
William Blyth, Esq.
Edward Lothian, Esq. advocate.
Archibald Millar, Esq. W. S.
James Nairn, Esq. W. S.
James Robertson, Esq. of Gogarburn.
John Gibson, Esq. writer, Edinburgh.

December 5. 1815.

The Right Hon. the Earl of Kellie.
The Right Hon. the Earl of Hopeton.
George Ramsay, Esq. of Inchrye.
Robert Dudgeon, Esq. of Marionville.
Robert Kerr, Esq. surgeon, Portobello.
James Walker, Esq. advocate.
Samuel Anderson, Esq. W. S.
Samuel Parkes, Esq. F. L. S. Lond.
Mr John Baxter, *sen.* Edinburgh.
Mr John Baxter, *jun.* Edinburgh.
James Swan, Esq. W. S.
Robert Cadell, Esq. Edinburgh.
Francis Bridges, Esq. Edinburgh.
John Kennedy, Esq. younger of Underwood.
James Eyre, Esq. Canonmills.
George Richmond, Esq. Oxgangs.
Mr James Miller, Newhouse.
Mr Thomas Russell, Waughton.

March 12. 1816.

The Hon. Sir Alexander Hope, K. C. B.
William Horne, Esq. advocate.
Dr James Murdoch, physician, Edinburgh.
James Spence, Esq. writer, Edinburgh.
William Alexander Martin, Esq. W. S.
Mr John Shanklie, Leith Walk Nurseries.
— George Brown, Fountainbridge.
— David Reid, nurseryman, Leith.
David Mitchell, Esq. Frederick Street.
Mr Robert Dickson, Bangholm.

June 11. 1816.

Dr George Augustus Borthwick, physician, Edinburgh.
Alexander Smith, Esq. banker.

Mr James Weddel, confectioner, Princes Street.

September 17. 1816.

James Balfour, of Pilrig, Esq.
Dr Adolphus Ross, surgeon, Edinburgh.
John Greig, Esq. Pitt Street.
Gilbert Finlay, Esq. W. S.
James Tytler, of Woodhouselee, Esq.
John Shank More, Esq. advocate.
William Mackerrell, Esq. of Hillhouse.
Edward Greig, Esq. surgeon, Nelson Street.
Robert Wilson, Esq. writer, Edinburgh.

December 3. 1816.

Robert White Melville, Esq. of Mount Melville.
Colonel George Paterson of Cunochie.
Henry Wood, Esq. of Eskbank.
Stuart Murray Fullerton, Esq. of Fullerton.
James Allan Maconochie, Esq. advocate.
James Ker, Esq. of Blackshiels.
Robert Daw, Esq. of the Customs.
James Neilson, Esq. writer, Edinburgh.
Mr Richard Paterson, merchant, Edinburgh.
John Spence, Esq. merchant, Leith.
Alexander Spence, Esq. merchant, Leith.
Samuel Watson, Esq. merchant, Leith.
Mr James Brown, accountant, Edinburgh.

March 11. 1817.

The Hon. Charles Hope of Rankeillor.
The Hon. Peter Robert Drummond Burrell of Perth.
James Adam, Esq. of Bar.
James Hoy, Esq. Gordon-Castle.
Sir John Hay of Hayston and Smithfield, Bart.
M. Pattison, Esq. of Morningside Bank.
William Macdonald, Esq. of St Martin's.

Rev. Dr Robert Anderson of Edinburgh.

June 10. 1817.

Sir Michael Shaw Stewart, Bart.
Stewart Moncreiff Threipland, Esq.
Archibald Cochran, Esq. of Ashkirk.
Peter Hill *sen.* Esq. Portobello.
George Clerk Craigie, Esq. of Dunbarnie.
Dr John Rogerson of Wamphray.
Alexander Gordon, Esq. Great King Street.
Capt. John Donaldson Boswell of Wardie.
Mr James Dickson *jun.* St Andrew's Street.
Capt. James Pringle, R. N. younger of Torwoodlee.
Mr William Machutcheon, writer, Edinburgh.
Dr Alexander Tweedie, Edinburgh.
John Carfrae, Esq. of Glenbog.
James French, Esq. Colinton Bank.
George Veitch, Esq. W. S. Edinburgh.
Robert Jameson, Esq. advocate.
Robert Sutherland, Esq. Edinburgh.

September 9. 1817.

The Right Hon. the Earl of Rosebery.
The Right Hon. Lord Elcho.
James Dundas, Esq. of Dundas.
Kincaid Mackenzie, Esq. merchant, Edinburgh.
James Denholm, Esq. Edinburgh.
David Paterson, Esq. *jun.* accountant, Edinburgh.

December 10. 1817.

The Right Hon. Lord Torphichen.
Colonel Don, of Springfield.
Mr James Macdonald, merchant.
John Parker, Esq. Charlotte Square.

March 10. 1818

George Leslie, Esq. of Leslie.

Dr John Shoolbred of Bengal.
Thomas Adinston, Esq. of Carcant.
Samuel Charteris Sommerville, Esq. W. S.
Andrew Thomson, Esq. younger of Kinloch, W. S. 295
John Dow, Esq. W. S. Edinburgh.
James Dunsmure, Esq. Secretary to the Board for the Herring Fishery, Edinburgh.
Robert Menzies, Esq. of Trinity.
William Wilson Duffin, Esq. Palace Yard.
Richard Duffin, Esq. Palace Yard. 300
Mr Thomas Oliver, printer, Netherbow.
— Charles Peacock, seedsman, Edinburgh.
— John Peacock, seedsman, Edinburgh.

June 8. 1818.

Dr Henry Dewar, physician, Edinburgh.
Dr John Thatcher, physician, Edinburgh. 305
Dr Patrick C. Baird, of Bombay.
Ebenezer Gilchrist, Esq. of Sunnyside.
Elias Cathcart, Esq. Edinburgh.
John Scotland, Esq. Edinburgh.
Mr Alexander Adie, optician, Edinburgh. 310
— John Ferme, Haddington.
— John Boyd, fruiterer, Edinburgh.
— Alexander Shirreff, seed-agent, Edinburgh.

September 8. 1818.

Sir William Forbes, Bart. of Pitsligo.
Major John Lumsdaine of Lathallan. 153
Alexander Thomson, Esq. W. S.
William Scott, Esq. W. S. Queen Street.
John Russell, Esq. W. S.
William Bell, Esq. of Rammerscales.
Andrew Milroy, Esq. North Bridge. 320
Thomas Bonnar, Esq. Edinburgh.

David Thomson, Esq. W. S.
Mr William Nivison, bookseller, Edinburgh.
James Macdowall, Esq. merchant, Leith.
Mr John Hay, fruiterer, Bank Street. 325
Henry Simpson, Esq. writer, Edinburgh.
Walter Moir, Esq. accountant, Edinburgh.
Archibald Torry, Esq. merchant, Edinburgh.
John Yule, Esq. W. S.
James Lyon, Esq. writer, Broughton Place. 330
Archibald Johnstone, Esq. younger of Pittoure.

December 8. 1818.

John Playfair, Esq. Professor of Natural Philosophy in the University of Edinburgh.
The Rev. Dr David Ritchie, Professor of Logic in the University of Edinburgh.
John Inglis, Esq. of Redhall.
William Davidson, Esq. of Hatton. 335
William Henderson, Esq. Secretary to the British Linen Company.
William Carfrae, Esq. merchant, Edinburgh.
Peter Dickson, Esq. merchant, Leith.
Robert Fraser, Esq. Malta House.
Michael Linning, Esq. of Colzium. 340
Captain James Stedman, 26th Regiment of Foot.
John Pollock, Esq. Edinburgh.
David Wardlaw, Esq. of Gogarmount.
John Manderston, Esq. Treasurer of the City of Edinburgh.
James Buchanan, Esq. merchant, Glasgow. 345
William Child, Esq. merchant, Edinburgh.
William Stevenson, Esq. M. D. Gilmerton.
Alexander Clapperton, Esq. Edinburgh.

March 4. 1819.

Dr John Warrick Pursell, physician, Edinburgh.
Dr William Howison, physician, Edinburgh.
John Bonar, Esq. of Wariston, banker, Edinburgh.
John Bonar *junior*, Esq. banker, Edinburgh.
William Robertson, Esq. Keeper of Records, Edinburgh.
Thomas Ewart, Esq. W. S.
James Haig, Esq. younger of Dollarfield, Alloa.
William Bardiner, Esq. younger of West Saline.
Richard Woolley, Esq. of Whitehouse.
William Fraser, Esq. Edinburgh.
Mungo Murray, Esq. of Kincairny.
Robert Bruce, Esq. of Kennet.
Robert Bald, Esq. Civil Engineer, Alloa.
Donald Horne, Esq. W. S.
Mr Abraham Thomson, Edinburgh.
Alexander Greig, Esq. accountant, Edinburgh.
James Nairne, Esq. W. S.
The Rev. Dr Thomas Macknight, Edinburgh.
James Jardine, Esq. Civil Engineer, Edinburgh.
Thomas Brown, Esq. Bookseller, Edinburgh.
James Thomson, Esq. coachmaker, Edinburgh.

CORRESPONDING.

Elected December 5. 1809.

Mr Robert Anderson, gardener, Hamilton Palace.
— James Smith, Keith Hall, Kintore.
— Robert Hosie, Lynedock, Perth.
— John Mitchell, Moncrieff House, Perth.
— Alexander Muirhead, Invermay, Bridge of Erne.
— Thomas Bishop, Methven, Perth.
— Alexander Dods, Saltonhall, Haddington.
— James Nisbet, St Mary's Isle, Kirkcudbright.
— Thomas Henderson, Blair Adam, Kinross.
— James Austin, nurseryman, Glasgow.
— James Bain, gardener, Dysart.
— James Kirk, Smeaton, Prestonkirk.
— William Beattie, Scone, Perth.
— John Henderson, nurseryman, Brechin.
— William Ballantyne, nurseryman, Dalkeith.
— Thomas Thomson, gardener, Tullyallan, Kincardine.
— Joseph Archibald, Dalhousie Castle, Lasswade.
— Thomas Thomson, Colerton Hall, Leicestershire.
— James Dods, Bargany, Girvan.
— John Mackintosh, Abercairney, Perth.
— George Lamb, Tonguehall, Leeds.
— John Shirreff, factor, Dunmore, Falkirk.

March 6. 1810.

Rev. Dr John Stuart, Luss.
Rev. Dr John Fleming, Flisk, Cupar-Fife.

Mr David Weighton, gardener, Lixmount, Edinburgh.
— James T. Mackay, College Botanic Garden, Dublin.
— James Laing, factor, New Tarbet, Parkhill.
— James Rintoul, gardener, Coilsfield, Irvine.
— William Dickson, Arniston, Lasswade.
— James Stewart, Pinkie House, Musselburgh.
— Alexander Stewart, Valleyfield, Culross.
— Peter Barnet, Kennet, Alloa.
— Daniel Crichton, Minto House, Hawick.
— John Naismyth, Culloden House, Inverness.

December 4. 1810.

Mr David Ford, Tyningham, Dunbar.
— Thomas Torrance, Liberton.
— John Gibb, East Linton, Prestonkirk.

March 5. 1811.

Mr Robert Ingram, Torry, Dunfermline.
— Walter Underwood, Eglintoun Castle.
— George Steel, market-gardener, Dundee.
— James Buchanan, nurseryman, Camberwell, London.
— William Affleck, gardener, Horndean, Coldstream.

June 5. 1811.

Mr William Gibbs, nurseryman, Inverness.
— David Trotter, gardener, Alva, Alloa.
— William Forsyth, Stobs, Peebles.
— James Lawrie, Spittalton, Mid-Calder.
— Alexander Melville, Ireland.

September 3. 1811.

Mr William Emslie, gardener, Adniston, Tranent.
— William Urquhart, nurseryman, Dundee.
— Andrew Picken, Kirkhill, Lasswade.
— William Brownlee, Berwick.

December 3. 1811.

Mr Robert Brown, Perth.
— James Brown, Perth.
— William Macnab, Superintendant, Botanic Garden, Edinburgh.
— George Sinclair, gardener, Woburn Abbey.
— Robert Blair, Stevenston, Haddington.
— George Ogilvie, Prestonhall, Ford.
— John Macdougall, Castle-Huntly, Inchture.
— Alexander Hay, Binns, Linlithgow.

March 10. 1812.

Mr James Patterson *jun.* Wishaw, Hamilton.
— George Guthrie, gardener, Gowkscroft, Ayr.
— David Creddie, Gatehouse of Fleet.
— Duncan Montgomery, Buchanan, Drymen.
— William Menzies, Meikleour, Cupar-Angus.
— James Pace, Gartmore, Callendar.
— John Kyle, Keir, Dunblane.
— Thomas Barton, Bothwell Castle, Hamilton.
— William Knox, Leven Grove, Dunbarton.
— John Machray, Errol.
— Archibald Gorrie, Rait, Errol.
— James Smith, Glasgow.

June 9. 1812.

Mr William Don, Superintendant, Botanic Garden, Hull.
— William Ramage, Callyhouse, Gatehouse.
— Thomas Petrie, Tillycoultry, Alloa.
— Andrew Murray, Harviston, Fushiebridge.
— James Hardie, Kailzie, Peebles.
— John Wanless, Montwhannie, Cupar-Fife.
— John Neilson, Penicuik House.
— Thomas Richardson, Redheugh.

Mr William Irvine, Capheaton.
— James Allan, Collinton.
— William Allan, Durie, Leven.
— Thomas Clarkson, Ireland.
— John Morison, Stranraer.

September 8. 1812.

Mr William Air, nurseryman, Coldstream.
— Alexander Gibson, gardener in Perth.

December 8. 1812.

Mr Collector Lorimer, Dunbar.
— Burnet, Viewfield, Dunbar.
Rev. Andrew Small, Auchtermuchty.
Mr William Affleck, gardener, Duddingston Cottage.
— William Crawford, North Park, Glasgow.
— John Liddel, near Greenock.
— William Bull, Drimmies, Inchture.

March 9. 1813.

Dr John MacCulloch, Woolwich.
Rev. John Black, Innerkeilor, Arbroath.
Mr John Wood, Edinburgh.
— Joseph Smeall, Millburn-Tower.
— Duncan Robertson, Megginch-Castle, Errol.
— John Campbell, Kinfauns, Perth.
— John Dick, Ballendean, Inchture.
— John Maxton, Lochwinnoch, Paisley.
— John Tweedie, Blairquhan, Maybole.

June 8. 1813.

Mr Archibald Duncan, Hope Temple, Paisley.
— John Middelton, Tillychewen, Dunbarton.
— Alexander Smith, Grangemuir, Pittenweem.
— John Ross, Dunkeld.
— David Laird, Balgone, North Berwick.

September 14. 1813.

Mr John Easton, Weens, Jedburgh.
— James Laird, Portmore, Peebles.
— John Young, Belmont-Castle, Meigle.
— John Kinment, Murie, Errol.

December 14. 1813.

Mr George Sanders, Gordon Castle, Fochabers.
— Alexander Falconer, Dalkeith.
— James Miller, Wales.
— Robert Warrix, Fasque, Fettercairn.
— James Walker, Melville Castle, Lasswade.
— David Macewan, Dunglass, Dunbar.
— Donald Fraser, Inverness.
— William Wales, Fetteresso Castle, Stonehaven.

March 8. 1814.

Rev. Dr Anthony Dow.
Mr George Munro, Dunse Castle, Dunse.
— Roderick Forbes, Kelso.
— George Brown, Dunbar House, Dunbar.
— George Shiells, Erskine House, Glasgow.
— John Aiton, Archerfield, Haddington.
— John Blackie, Calder House, Mid-Calder.

June 14. 1814.

Mr George Don, Chelsea Garden.
— David Don, Edinburgh.

September 13. 1814.

Mr Robert Murray, Edinburgh.
— Alexander Meek, Dunbarton.

December 13. 1814.

Mr John Stewart, Auchincruive, Ayr.
— Alexander Smith, Pitfour, Perth.
— James Falconer, Cambo House, Crail.

Mr William Ingram, Pitmilly, Crail.
— George Clark, Lochnell, Bonaw.
— Alexander Murdoch, Huntly Lodge, Huntly.
— William Chalmers, Allanbank, Dunse.
— John Begbie, Rossie Castle, Montrose.
— William Reid, Lees, Coldstream.
— George Fraser, Coul, Inverness.
— James Henderson, Barras, Stonehaven.
— George Pattison, Invergordon.

March 8. 1815.

Mr John Reid, Yester, Haddington.

June 6. 1815.

Mr James Reid, Kinnaird, Montrose.
— David Stewart, Inch House, Edinburgh.
— James Pyper, Phesdo, Fettercairn.

September 5. 1815.

Mr Duncan Gillies, Glasgow.
— George Dickson, Niddry, Edinburgh.

December 5. 1815.

Dr Joseph Hamel, in the service of the Emperor of Russia.
William Grierson, Esq. Secretary of the Horticultural Society, Dumfries.
Mr James Howe, Rossie, Bridge of Erne.
— David Beveridge, Kilgraston, Bridge of Erne.
— Archibald Reid, Balcarras, Colinsburgh.
— John Carson, Charlotte Square.
— Craig Pillans, Fleurs, Kelso.
— William Sanderson, Alderstone, Haddington.

June 11. 1816.

Mr James Gourlay, Chesters, Jedburgh.
— John Kelly, Donibristle, Inverkeithing.
— John Hamilton, Callendar-House, Falkirk.

Mr Thomas Greig, Johnston's Lodge, Laurencekirk.
— John Taylor, Dunmore Park, Falkirk.
— John Falconer, Strathtyrum, St Andrew's.
— George Taylor, Duplin Castle, Perth.

September 17. 1816.

Mr David Bishop, Broomhall, Dunfermline.

December 3. 1816.

Mr William Smith, Rosedoe, Luss.
— Daniel Robertson, Walkinshaw, Paisley.
— Andrew Gibson, Glasserton, Whithorn.
— Robert Kennedy, Galloway House, Wigton.
— James Hannay, Drumlanrig, Thornhill.
— George Paterson, Kirkconnel, Dumfries.
— James Bogie, Terraughty, Dumfries.
— Robert Carment, Terreagles, Dumfries.
— Peter Grierson, Richardby, Annan.
— Robert Purves, Caprinton, Kilmarnock.
— Robert Elliot, Castle-Craig, Coudenburn.
— George Watson, Tarvit, Cupar-Fife.
— John Chalmers, Kinordie, Kirriemuir.
— Alexander Scott, Seton, Arbroath.
— Stewart Murray, Botanic Garden, Glasgow.
— Ogilvie Neil, St Martins, by Perth.

March 11. 1817.

— Walter Shearer, King's Meadows, Peebles.
— William Macmurtrie, Sherghborough, Staffordshire.

June 10. 1817.

Leonard Phillips *jun.* Esq. near Vauxhall, London.

September 9. 1817.

Dr David Whyte, Medical Board, Bombay.
Dr George Govan, Saharunpore, Bengal.
Major Alexander Duncan, Native Infantry, Bengal.
Captain John Duncan, Bengal.

Mr John Booth, nurseryman, Flotbeck, Hamburgh.

December 10. 1817.

Mr James Dickson, Covent Garden.

Mr Charles Edgecombe, gardener, Amisfield, Haddington.

— Nackbar, of Brentford.

— James Anderson, Covent-Garden, London.

John Carr, Esq. of St Anne's, near Leeds.

John Latham, M. D. Rumsey.

Mr George Watson, gardener, Broadlands.

— Walter Henderson, Woodhall, Glasgow.

— Alexander Forrester, Carlourie, Kirkliston.

— John Street, flower-gardener, Biel, Haddington.

— William Knox, Newton Don, Kelso.

September 8. 1818.

Rev. Thomas Cleghorn, Smallholm.

Mr John Richmond, nurseryman, Annan.

— David Brown, gardener, Arisaig.

December 8. 1818.

Mr William Middleton, gardener, Fyvie Castle, Old-Meldrum.

— Robert Reid, Castlesemple, Paisley.

March 4. 1819.

— James Harrold, gardener, Kirkmay, Kirkcaldy.

FOREIGN CORRESPONDING MEMBERS.

December 10. 1817.

Mr Thomas Blaikie, Ingenieur des Jardins Anglais, St Germains.

— André Thouin, Jardin des Plantes, Paris.

— Jean Thouin, do. do.

— Jean Mozard, cultivator of peach-trees at Montrueil, near Paris.

— Joseph Parmentier, botanist, and Mayor of Enghien. 5

— Van Mons, Professor of Rural Economy at Louvain.

— De Wulf, Academy at Ghent.

— Pierre Gothard, principal gardener to Madame Vilant Quatorze, near Ghent. 8

OFFICE-BEARERS

For the year 1819.

His Grace the Duke of Buccleuch and Queensberry,
President.

Dr Duncan *senior*, *Permanent* 1*st Vice-President.*

George Bruce, Esq.
John Wauchope, Esq. } *Vice-Presidents.*
Sir John Hope, Bart.

Mr Patrick Neill,—*Secretary.*
Mr John Peacock,—*Assistant.*
Mr Andrew Dickson,—*Treasurer.*

COUNSELLORS.

Professional.	*Amateur.*
Mr Charles Norval.	Gilbert Innes, Esq.
Mr James Macdonald.	William Pagan, Esq.
Mr Walter Dickson.	David Falconar, Esq.
Mr James Stewart.	Robert Johnston, Esq.
Mr William Macnab.	Dr John Yule.
Mr James Dickson *sen.*	John A. Murray, Esq.

GENERAL COMMITTEE FOR PRIZES.

Sir George S. Mackenzie, Bart.—*Convener.*

Professional.	*Amateur.*
Mr Alexander Henderson.	Dr T. C. Hope.
Mr Thomas Shade.	John Linning, Esq.
Mr George Dickson.	James Tytler, Esq.
Mr John Boyd.	James Balfour, Esq.

Superintendant of Experiments,
Mr John Fletcher.

Painter of Fruits and Flowers,
Mr Patrick Syme.

The Vice-President for the day, is *ex officio* a Member of the Committee for Prizes. The Secretary and Treasurer are, *ex officiis*, Members of all Committees, where their assistance is required.

PREMIUMS

AWARDED BY THE SOCIETY.

Continued from Vol. ii. p. 38.

Silver Medal,

(Unless otherwise specified.)

1815.

Mar. 8. *Late Broccoli.*—Two medals awarded:

1. To Mr David Ford, gardener, Tyningham.
2. To Mr James Smith, gardener, Ormiston Hall.

Brussels Sprouts.—Two medals awarded:

1. To Mr David Ford, gardener, Tyningham.
2. To Messrs Dicksons Brothers, Broughton Nurseries.

May 9. *Finest Seedling Polyanthuses.*—To Mr John Scott, market-gardener, Glasgow.

Finest Seedling Auriculas.—To Mr John Mitchell, gardener, Moncrieff House.

Finest Stage Auriculas.—Two medals awarded:

1. To Mr Robert Kirkwood, gardener, Elderslie.
2. To Mr William Menzies, gardener, Meikleour House.

1815.

May 9. *Improved Hot-bed Frame.*—Extra medal. To Mr William Sanderson, gardener, Alderstone.

May 23. *Fine collection of Tulip Flowers.*—To Messrs Dicksons and Company, Leith Walk Nurseries.

For another collection of Tulips.—Extra medal. To Mr Thomas Shade, St Ann's Bank Nurseries.

June 6. *For fine Anemonies.*—Two medals awarded:

1. To Messrs Dicksons Brothers, Broughton Nurseries.
2. To Mr Robert Elly, Musselburgh.

For best Ranunculuses.—To Mr Peter Johnstone, gardener at Restalrig.

For Dutch Turnips from Home-saved Seed.—To Mr George Still, gardener at Fernyhill.

July 25. *Essay on the Management of the Fig Tree in Scotland.*—To Mr James Smith, gardener, Ormiston Hall.

Communication regarding the Management of Bees.—To Dr James Howison, Crossburn House.

Aug. 2. *Finest Pinks.*—To Mr Alexander Henderson, Meadowbank Nurseries.

Best Gooseberries.—To Mr James Macdonald, gardener, Dalkeith House.

Sept. 5. *Home-made Wines.*

White Currant Wine.—To Mrs Thomson, Milton House.

Red Currant Wine.—To Mrs Thomson, Milton House.

1815.

Sept. 5. *Black Currant Wine.*—To Mr Underwood at Eglintoun Castle.

Raisin Wine.—To William Bell, Esq. W. S.

Clary Wine.—To Mrs Walker, Drumseugh.

Wine from mixed Fruits.—To Mrs Walker, Drumseugh.

Gooseberry Champaigne.——To Mrs George Kinnear.

Peaches from the open Wall.—To Mr Archibald Knox, gardener at North Berwick House.

Peaches from a Flued Wall.—To Mr David Trotter, gardener at Alva.

Nectarines from open Wall.—To Mr David Trotter, gardener at Alva.

Moorpark Apricots.—To Mr Walter Underwood, gardener at Eglintoun Castle.

Best three kinds of Plums.—To Mr William Affleck, gardener at Hirsel.

Best Pine-apple.—To Mr Walter Underwood, gardener at Eglintoun Castle.

Frontignac Grapes.—To Mr Joseph Archibald, gardener at Dalhousie Castle.

White Muscat Grapes.—To Mr John Heriot, gardener at Parson's Green.

Fine Lombardy Grapes. Extra medal.—To Mr Alexander Dodds, gardener at Clarkington.

Best three kinds of Pears.—To Mr George Kay, gardener at Restalrig.

Summer Apples.—To Dr Duncan *senior*, St Leonard's.

1815.

Sept. 5. *Best preserved Apples of former Year.*—To Mr James Smith, gardener at Ormiston Hall.

Finest Seedling Carnations.—To Mr Stewart Miller, gardener at Belmont Castle.

Finest Stage Carnations.—To Mr Alexander Henderson, Meadowbank Nurseries.

For numerous Horticultural Improvements on Scientific Principles. GOLD MEDAL.—To Thomas Andrew Knight, Esq. of Downton.

Dec. 5. *For an account of an Economical Hot-house.* GOLD MEDAL.—To Sir George Mackenzie, Bart.

Largest quantity of Home-made Wine, manufactured for Sale in 1814.—To Mr George Montgomery, Edinburgh.

Greatest quantity of Sea-Cale sent to the Edinburgh Market in 1814.—To Mr Henry Turnbull, gardener at Craiglockhart.

Largest quantity of Onion Seed saved in Scotland in 1814.—To Mr James Arklie, gardener, Rockville.

Beautiful Drawing of the Scottish Golden Nonpareil.—To Miss Farquharson, Howden.

Ditto of the Lemon Apple.—To Miss Mary Maitland, Rankeillour.

Ditto of the Colmar Pear.—To Miss Farquharson, Howden.

For long and faithful service as head Gardener.—Two medals awarded :

1. To Mr Robert Begbie, at Pencaitland.
2. To Mr James Stewart, at Pinkie.

1815.

Dec. 5. *Woollen Nets manufactured in the loom for protecting fruit-tree blossom.)* Extra medal. —To Mr James Dawson, manufacturer, Haddington.

Best three sorts of Apples not generally known. —To Mr William Affleck, gardener, Hirsell.

Best three Colmar Pears.—To Mr David Ford, gardener, Tyningham.

Best three Crasanne Pears.—To Mr Walter Underwood, gardener, Eglinton Castle.

Best three kinds of Pears.—To Mr Robert Ingram, gardener, Torry.

Best six heads of Endive.—To Mr Walter Underwood, gardener, Eglinton Castle.

Best twelve heads of Celery.—To Mr John Taylor, gardener, Gayfield House.

Best 25 *Orange Carrots.*—To Mr George Still, gardener, Broughton.

Several kinds of new seedling Potatoes. Extra medal.—To Mr William Brown, gardener at Southbarr.

Three sorts of seedling Apples.—To Mr Alexander Wilson, gardener, Ladykirk.

1816.

Mar. 12. *Best Brussels Sprouts.*—To Messrs Dickson and Co. nurserymen, Leith Walk.

Best Spring Broccoli.—To Mr James Reid, gardener, Thurston.

May 7. *Best six seedling Polyanthuses from seed sown in former Year.*—To Mr William Henderson, gardener, Delvine.

Best six seedling Auriculas, from seed sown in former year.—To Mr John Kyle, gardener, Kier.

1816.

May 7. *Best six Stage Auriculas.*—To Messrs Dicksons and Company, Leith Walk Nurseries.

Best six heads of Early Dwarf Cabbage.—To Mr David Macewan, gardener, Dunglass Castle.

June 11. *Best twelve Tulips, from bulbs imported in* 1815.—To Mr Duncan Gillies, florist, Glasgow.

Best six Polyanthus-narcissus.—To Mr John Taylor, gardener, Gayfield House.

Best Dozen Early Turnips, from Home-saved seed.—To Mr George Kay, gardener, Restalrig.

A parcel of very fine Early Horn Carrots.—To Mr Walter Underwood, gardener, Eglinton Castle.

For judicious experiments in naturalizing tender Exotics to the climate of Scotland.—Extra medal. To Mr William Macnab, Royal Botanic Garden, Leith Walk.

July 2. *Ranunculuses.*—Two medals awarded:

1. To Mr Robert Elly, Musselburgh.
2. To Mr Alexander Henderson, Nurseryman.

Anemonies.—To Messrs Dickson, and Company, Leith Walk Nurseries.

Forced Peaches.—To Mr David Trotter, Alva.

Aug. 6. *Finest Seedling Pinks.*—To Mr A. S. Porterfield, St Bernard's Garden.

Best Melon.—To Mr William Sanderson, gardener, Alderston.

Best green flesh Melon.—To Mr John Kyle, gardener, Kier.

1816.

Sept. 17. *Peaches from flued walls, without Glass.*—To Mr John Macnaughton, gardener, Edmondstone.

Nectarines from flued walls without glass.—To Mr Robert Ingram, gardener, Torry.

Moorpark Apricots.—To Mr James Kirk, gardener, Smeaton.

Best three sorts of Plums.—To Mr James Macdonald, gardener, Dalkeith House.

Best dozen of green-gage Plums.—To Mr Macdonald.

Best three sorts of summer Pears, and best three sorts of summer Apples.—To Mr Macdonald.

The Largest Pine-apple.—To Mr John Aiton, gardener, Archerfield.

Finest Frontignac Grapes.— To Mr George Taylor, gardener, Wemyss Castle.

Largest bunch of Grapes.—To Mr George Taylor.

Grapes with the best flavour.—To Mr John Aiton, gardener, Archerfield.

Finest seedling Carnations.—To Mr John Mitchell, gardener, Moncreiff House.

Finest Carnations, stage flowers.—To Mr James Finlayson, Paisley.

Apples of the former year, in the highest state of preservation—To Mr Thomas Kelly, gardener, Airthrie Castle.

Home-made Wines.

1. *White Currant Wine.*—To Mrs Isabella Baynes, Stockbridge.
2. *Red Do.*—To Mrs Whytock, Nicolson Street.

1816.

Sept. 17. 3. *Black Do.*—To Miss M. Grahame, Dalkeith.

4. *Gooseberry Champaigne.*—To Mrs Macdonald, Powder-hall.

Balm Wine.—To Mrs Young, Queen Street.

Fine Morella Cherries.—To Mr Thomas Dewar, gardener, to the Earl of Wemyss, Queen Street.

Nov. 28. *For a collection of seventy sorts of Apples.*—Extra medal. To Mr Joseph Kirk, at Brompton.

Dec. 3. *For the best design of an Experimental Garden.*—Gold medal. ToMr John Hay, Edinburgh.

Second best Ditto.—Silver medal. To Mr Archibald Gorrie, Rait.

For a collection of Clydesdale Apples.—To Mr George Sked, gardener, Coltness.

Best three sorts of Apples lately introduced into Scotland.—Two medals awarded:

1. To Mr James Macdonald, gardener, Dalkeith.

2. To Mr William Purves, gardener, Caprinton.

Best three sorts of Pears.—To Mr James Macdonald, Dalkeith.

Best three Colmar Pears.—To Mr James Stewart, gardener, Pinkie.

Best three Crasanne Pears.—To Mr James Arklie, gardener, Rockville.

Best twelve heads of Celery.—To Mr Arklie.

Best six heads of Endive.—To Mr John Heriot, gardener, Parson's Green.

Best twelve Onions, from seeds saved in Scotland.—To Mr George Fowler, gardener, Luffness.

1816.

Dec. 3. *Fine seedling Apples.*—Two medals awarded:
1. To John Dalyell, Esq. of Lingo, Fife.
2. To Mr James Bogie, gardener, Terraughty.

Seedling Potatoes.—Two medals awarded:
1. To Mr Burns, Causewayside, Paisley.
2. To Mr George Fraser, gardener, Coul.

Drawings of Apples.—Two medals awarded:
1. *Ribston Pippin.*—To Miss Farquharson, Howden.
2. *Paradise Pippin.*—To Miss Sophia Agnes Young, Queen Street.

1817.

Mar. 11. *Best Sulphur Broccoli.*—To Mr David Ross, gardener, Hermitage.

Best Brussels Sprouts.—To Mr John Macnaughton, gardener, Edmonstone.

June 10. *Best dozen of early Dutch Turnips from home-saved seed.*—To Mr A. S. Porterfield, St Bernard's.

Best twelve seedling Tulips fit for breeders raised in Scotland.—To Mr Robert Elliot, gardener, Castlecraig.

A specimen of very fine Seville Oranges produced at Bonington, near Lanark.—Extra medal. To Mr Archibald Sinclair, gardener there.

Very fine Bunch of black Hamburgh Grapes.—To Mr George Taylor, gardener, Wemyss Castle.

Sept. 9. *Best Peaches from unflued Walls.*—To Mr Kirk, gardener, Smeaton.

1817.

Sept. 9. *Best Nectarines.*—To Mr Macnaughton, gardener, Edmonstone.

Best Apricots.—To Mr Arklie, gardener, Rockville.

Best Plums.—To Mr Kirk, gardener, Smeaton.

Best retarded Gooseberries.—To Mr Allan, Colinton.

Best White Muscat Grapes of Alexandria.—To Mr Ford, gardener, Tyningham.

Best three sorts of Grapes.—To Mr George Brown, Dunbar House.

Best Summer Pears.—To Mr Kay, gardener, Restalrig.

Best seedling Carnations.—To Messrs Peacocks, Stanwell Lodge, Bonington.

Best Apples of former year.—To Mr George Taylor, gardener, Wemyss Castle.

Home-made Wines.

1. *Best Currant Wine.*—To Mrs Carmichael, Rankeillor Street.
2. *Best red Currant Do.*—To Mrs William Dickson.
3. *Best black Currant Do.*—To Mrs Crichton, Minto Garden.
4. *Best Gooseberry Do.*—To Mrs Alexander Smith, Nicolson Street.

October *A large collection of Orchard Fruits.*—To Mr William Smith, gardener, Luss.

Dec. 17. *Best three sorts of Apples.*—To Mr James Kirk, gardener, Smeaton.

1817.

Dec. 17. *Excellent specimens of the Crasanne, Colmar, and Grey Achan Pears.*—To Mr Alexander Kelly, gardener, Donibristle.

A collection of Clydesdale Apples, with names, &c.—To Mr George Sked, gardener, Coltness.

Best Onions raised from seeds saved in Scotland.—To Mr James Arklie, gardener, Rockville.

Extensive Mushroom beds.—Silver medal and Five Guineas. To Mr James Cunninghame, Comely Bank.

Drawings of Apples and Pears.

1. *Golden Pippin.*—To Miss Elizabeth Boswell, Balmuto.
2. *A large Apple, not named.*—To Miss Mary Maitland, Rankeillour.
3. *Jargonelle Pear.*—To Miss Eliza Maitland, Rankeillour.
4. *Small Pear, not named.*—To Miss C. Baxter.

Long and faithful Service as head Gardener.—To Mr Andrew Greig, Blair.

Fine specimens of Apples and Pears.—To Mr John Clark, gardener, Gosford.

Mode of Cultivation of the Lathyrus tuberosus.—To Mr James Dickson, Covent Garden.

1818.

Mar. 10. *For General Services to the Society.*—Annual GOLD MEDAL. To Mr Neill, Secretary.

Invention of an Instrument for earthing up garden crops.—To Mr John Taylor, Gayfield House.

1818.

Mar. 10. *Best Sulphur Broccoli.*—To Mr David Ross, gardener, Hermitage.

Best Genuine Savoys.—To Mr Thomas Davidson, gardener, Summerfield.

Best Mushrooms.—To Mr Alexander Kelly, gardener, Donibristle.

Model of a large Apple from Baltimore.—To Mr William Bullock *sen.* Piccadilly Museum.

June 9. *Best Early Melon.*—To Mr George Monro, gardener, Dunse Castle.

Fine Cauliflower.—Extra medal. To Mr Thomas Henderson, gardener, Linkfield Hall, Musselburgh.

Sept. 8. *Best Peaches from unflued Walls.*—To Mr David Ford, gardener, Tyningham.

Best Peaches from flued Walls.—To Mr George Dickson, gardener, Niddry.

Best Nectarines.—To Mr George Shiells, gardener, Erskine House.

Best Apricots.—To Mr John Macnaughton, gardener, Edmonstone.

Best Plums.—To Mr John Kyle, gardener, Kier.

Best retarded Gooseberries.—To Mr Joseph Archibald, Dalhousie Castle.

Best Summer Pears.—To Mr James Macdonald, Dalkeith.

Best Pine-apple.—To Mr Alexander Muirhead, gardener, Invermay.

Best Grapes.—To Mr Robert Ingram, gardener, Torry.

Best Constantia Grapes.—To Mr Thomas Gray, gardener, Ballencrieff.

1818.

Sept. 8. *Finest Tokay Grapes.*—To Mr Adam Melrose, gardener, Ardgowan.

Best Summer Apples.—To Mr James Macdonald, Dalkeith.

Beautiful Dahlias.—Two Medals awarded:

1. To Mr William Macnab, Royal Botanic Garden, Leith Walk.
2. To Messrs C. & J. Peacocks, nurserymen, Stanwell Lodge, Leith.

Best Home-made Wine.—To Mrs Hillocks, Finhaven, Forfarshire.

Oct. 5. *Seedling Potatoes.*—Extra medal. To Mr John Ogilvy, Kittens, near Cupar.

Dec. 8. *Experiments on the Culture of Onions.*—GOLD MEDAL. To Mr James Macdonald, Dalkeith.

Best three sorts of Apples not generally known in Scotland.—To Mr James Macdonald, Dalkeith.

Collection of Carse of Gowrie Apples, with names, &c.—To Messrs Machray and Gorrie.

Best French Pears.—To Mr Robert Ingram, gardener, Torry.

Best Achan Pears.—To Mr Ingram.

Fine Chaumontelle Pears.—Extra medal. To Mr Joseph Archibald, gardener, Dalhousie Castle.

Largest quantity of early White Turnip, seed saved in Scotland.—To Alexander Henderson, Esq. Meadowbank.

1818.

Dec. 8. *Seedling Apples.*—One GOLD MEDAL, and four Silver medals awarded:

1. GOLD MEDAL. To Mr James Macdonald, Dalkeith.
2. Silver do. To Mr John Gibb, gardener, East Linton.
3. To Mr William Beattie, gardener, Scoon.
4. To Mr Alexander Wilson, gardener, Ladykirk.
5. To Mr R. Blair, gardener, Stevenson.

Long and faithful Service as head Gardener.—To Mr James Young, gardener at Balmuto.

1819.

Mar. 4. *Best genuine Savoys, seed saved in Scotland.*—To Mr John Ferguson, gardener, Prestonpans.

Best house Mushrooms.—To Mr John Ross, gardener, Dundas Castle.

Best Brussels Sprouts, seed saved in Scotland.—To Mr John Macnaughton, gardener, Edmonstone.

May 7. *Fine collection of Stage Auriculas.*—To Messrs C. & J. Peacock, Stanwell Lodge.

MEMOIRS, &c.

I.

On the Employment of Common Salt for the Purposes of Horticulture.

By Samuel Parkes, F.L.S. &c. London.

In a Letter to Mr Neill, Secretary.

(Read 4th March 1819.*)*

Dear Sir, *January* 1. 1819.

As you have repeatedly suggested that I should send you a paper for the Caledonian Horticultural Society, I embrace the earliest opportunity of complying with your request, by transmitting to you my observations on the various uses to which Common Salt might be applied in the practice of horticulture.

If you conceive these to be worthy the notice of the Society, I will thank you to present this paper upon the subject at one of the first meetings. I remain, &c.

S. PARKES.

To PATRICK NEILL, Esq. Secretary.

On the Employment of Common Salt in Horticulture.

As a science, *Horticulture* is comparatively but of a modern date. It was unknown both in Greece and in ancient Rome; for in all the accounts which we have of the bagnios, the grottos, the nymphæ, and the aqueducts, which were considered so ornamental to their cities, there is, I believe, nothing described which conveys any idea whatever of our modern gardens. The Britons, like the Romans and the ancient Germans, made use of herbs and fruits; but, according to Strabo, they were such as grew in the fields and woods, without cultivation. Indeed, it has often been questioned, whether the hanging-gardens of Babylon, of which so much has been said, were not more for the display of an original kind of architecture, or for the ostentatious exhibition of ornamental and expensive sculptures, and enormous idols of gold and silver, than for any purposes of real utility.

Even in the Augustan age, when the wines of Italy were in general estimation, little was known

of the true method of cultivating the Vine, as appears from a story which is recorded by Pliny. He relates that a celebrated grammarian, who lived in the reign of Tiberius*, bought a vineyard, which had been so much neglected by its former owner, that it had become almost barren; and that when, by care and attention, he had rendered it fruitful, his neighbours, who had no idea that trees could be so improved by cultivation, and whose vineyards had always been much less productive, propagated a story that he had procured such unusual crops by the arts of magic and sorcery †.

It likewise appears from a variety of testimony, that the ancients were equally ignorant of the methods of rearing shrubs, herbs, and plants. Such of these as were cultivated, were preserved merely for the purposes of medicine; and though the medical professors had this stimulus, their knowledge of varieties seems to have been very limited. Theophrastus, a writer of great credit, who carefully collected plants as well as minerals, and who collected not only those of Greece, but travelled in Egypt, Ethiopia, and Arabia, for the improve-

* In a century or two after this period, it is probable that the Romans had acquired more knowledge of the management of vineyards; for we read that, about A. D. 278, the settlers in Britain, finding that some parts of the island were not unfit for vineyards, obtained permission from the Emperor Probus to plant vines here, and make wine from their produce.

† Pliny, lib. xiv. c. 3.

ment of science, was able to obtain only 600 species. Monsieur Rollin, however, tells us, that when, by order of Pope Nicholas V. in the middle of the 15th century, a translation of the work of Theophrastus was printed, the physicians of that day, perhaps the only class of men who attended to the orders of plants, were so dissatisfied with the narrow limits of botanical knowledge, that resolutions were taken to go in quest of it to the very places from whence Theophrastus and others of the ancients had written. He adds, that in consequence of these decisions, voyages were made to the Islands of the Archipelago, to Palestine, to Arabia, and to Egypt; and these expeditions were attended with so much success, that in the beginning of the 16th century, the learned were in possession of the description, not of 600 only, but of more than 6000 plants, with engraved figures of each *.

It seems, however, that Botany did not obtain much of the appearance of a science until the beginning of the last century, when Louis XIV. with the munificence becoming a great prince, commissioned Mons. Tournefort to make a botanical excursion through many of the provinces of Asia and Africa, to collect plants, and to make observations upon natural history in general. This great man received the King's order in the year

* Rollin's History of the Arts and Sciences of the Ancients, vol. iii.

1700, and, although he was driven home in 1702, by the fear of the plague which then raged in Egypt, he brought home so many new plants, that he could enumerate 1356 distinct species, without including any of those which he had collected in his former travels.

The learned throughout Europe were proud of these achievements, and Tournefort was considered to be one of the greatest ornaments of France. In England, however, we had the excellent and eminent John Ray, a man whom we had equal reason to value and admire, who indeed rather preceded Tournefort, and was equally assiduous in his endeavours to promote the knowledge of plants. In consequence of the exertions of this great man, and of the methodical arrangements which he had formed of the vegetable kingdom, together with the subsequent labours of Boerhaave, Linnæus, Hudson, and others, Botany, about the middle of the last century, assumed a distinguished rank among the sciences of Europe.

Such are the fruits of excessive industry, when directed by taste and by the energies of an enlarged mind; but the discovery and arrangement of new plants were not the only benefits that were achieved by the exertions of a succession of great men, all directed to the attainment of one important object; for with the knowledge of plants, the want of gardens increased *; and as these be-

* I am aware that there were gardens in Great Britain before the Norman Conquest, belonging to the Monks, but the

came more common, the public gradually acquired a taste for planting, until the desire of possessing a garden became general throughout Europe.

The changes which this produced in society were many and important; and, I have no doubt that, a person now travelling through Europe, and making this one of the objects of his inquiry, would find the character of each people more or less favourable, according to the degree in which a taste for gardening prevails among them. Were I asked to enumerate the causes which produced that increase of civilization, which has gradually taken place during the last two or three centuries, I should most certainly place the introduction of gardening next to the invention of printing. The possession of a garden has a natural tendency to soften the character of the most ferocious; it attaches a man to home, and doubles the value of his habitation; and whenever its cultivation is engaged in with ardour, it not only affords an innocent means of occupying leisure hours, but it has also the important effect of diverting the attention from all low and unworthy pursuits.

inhabitants in general had not this useful luxury. There were also large vineyards here in the 12th century. William of Malmesbury says, that the grapes produced in the vale of Gloucester were of the sweetest taste, and made most excellent wines, but these were likewise the property of the great Barons, the Monks, and Abbots: for the general inhabitants of the country participated neither in the credit nor profit which was attached to these establishments.

Buffon, the celebrated French naturalist, was so enamoured of his garden, that he erected a pavilion within it, in which he could study with convenience. There he usually retired at five o'clock in the morning, and was then inaccessible. Prince Henry of Prussia named this sylvan retreat the "cradle of natural history." The illustrious Lord Bacon has pronounced gardening to be "the purest of human pleasures, and the greatest refreshment to the spirit of man."

The dissemination of a taste for gardening is, in my opinion, one of the most valuable effects of the establishment of all horticultural societies: and I have no doubt but that, in this way, the Caledonian Horticultural Society will be found to be eminently useful. While addressing the members of this respectable association, I hope I may be allowed to say, that I feel proud of having been enrolled among those whose efforts tend not only to the improvement of natural history, and all rural economy, but also to the promotion of moral habits and propensities. Penetrated with these feelings, I shall greatly rejoice if the following observations and collection of facts, upon a subject in which the public seem now to take considerable interest, should in any degree excite a general desire in others to further the important objects of the Society.

The subject which I have now chosen for discussion and investigation, is the application of *Common Salt to the purposes of Horticulture*, the

several branches of which I propose to consider in the following order:

1*st*, That common salt, when applied in due proportion, has the effect of promoting the health and growth of vegetables.

2*dly*, That it has the property of rendering fruit trees and esculent plants, unfit for the food or the habitation of worms and insects.

3*dly*, That common salt is one of the most efficacious substances that can be employed in a garden for the destruction of worms and insects; and,

4*thly*, That common salt may, with material advantage, be likewise used for the destruction of weeds, or other noxious vegetables.

Under the first division of our subject, it is to be observed, that the celebrated Dr Darwin, when treating of common salt as a manure for land, asserts, that this substance "is a stimulus which excites the vegetable absorbent vessels into greater action than usual, and that, in a certain quantity, it increases their growth, by enabling them to take up more nourishment in a given time; and consequently, to perform their circulations and secretions with greater energy." Sir Humphry Davy, from what he says in his Agricultural Chemistry, seems, on the other hand, to think it also probable, "that common salt acts as a manure, by entering into the composition of the plants, somewhat in the same manner as gypsum, phosphate of lime and the alkalies."

These opinions will be thought to have great weight; but as few persons, comparatively speaking, will be able to confirm them by their own experience, in consequence of the very limited attention that has hitherto been bestowed on the use of salt in horticulture, the more useful way, perhaps, of treating this subject, will be to lay before the Society the evidence of those practical men, who have already published the results of their experiments, and then to draw such conclusions as their communications may seem to justify.

Dr Brownrigg, who, in the year 1748, published a valuable work "On the Art of making common Salt," makes the following statement.

"Salt," says he, "contributes greatly to fructify the earth, and when properly used as a manure, affords ample nourishment to corn and other vegetables, and renders kingdoms rich and fertile, where it happens to abound in the soil," p. 158.

Mr Hollingshead, a gentleman of considerable fortune, who resided near Chorley in Lancashire, and spent many years in making experiments on the application of common salt as a manure, and who also made powerful efforts to obtain a repeal of the Salt Laws, published a few years before his death, a very interesting pamphlet on the subject. In this work, to which I am greatly indebted for much useful information, he relates, that "when foul salt was permitted to the farmers duty free, a person near Middlewich in Cheshire, trenched his garden in autumn, mixing with the soil a quanti-

ty of foul salt. The following spring, it was dug or delved in the usual method, and planted with potatoes. The crop produced therefrom was such as far exceeded his most sanguine expectations. Twenty of the potatoes were produced, which weighed sixty pounds."

Several other testimonies to the beneficial effects of common salt in the culture of the POTATO might be produced, but I recollect none so decisive as that of the Reverend Dr Cartwright, which is published in the fourth volume of the Communications to the Board of Agriculture.

Having previously prepared a piece of land for the experiments, on the 14th of April 1804, a portion of the land was laid out in beds of one yard wide and forty yards long, twenty-four of which were manured in different ways; one of the beds had no manure, and fifteen of the beds had salt put upon them, in the proportion of a quarter of a peck to each bed. On the same day the whole was planted with potatoes, a single row in each bed; and that the experiment might be conducted with all possible accuracy, the same sets were planted in each bed. On the 21st of September, the potatoes were taken up, and the produce of each row was accurately ascertained; from which it appeared, that in every instance excepting one, where the salt was used, the crop was found to be superior; so that, of ten different manures, most of which are of known and acknowledged efficacy, salt proved superior to them all, one only except-

ed, viz. chandlers graves; and that bed in which salt and soot were combined, produced of all others, the *best* crop. But the most singular circumstance, and that which has induced me to submit the relation of this experiment to the Society, is, that where salt was used, whether by itself or in combination, the roots were entirely free from the scabbiness to which potatoes are often liable, and from which none of the other beds were altogether exempt, although there were in the same field nearly forty beds of potatoes, besides those which were planted for the sake of these experiments.

In the culture of the TURNIP, salt is also very efficacious. In the twenty-seventh volume of the Annals of Agriculture is a paper communicated by Davies Giddy, Esq. President of the Penzance Agricultural Society, which contains an account of some very important experiments on this subject. At Michaelmas 1790, Mr Sickler, a member of the Society, entered upon an estate, so much impoverished by the former tenant, as scarcely to return the value of the seed. In the spring of 1791, Mr Sickler prepared two acres for turnips, which had borne seven crops of oats in succession. The last crop did not produce nine bushels on an acre. In the first week of April, the earth from the ditches was carried into the field, and laid in four piles; each received three cart-load of sea-shell sand, and five bushels of salt. The earth from another ditch, chiefly consisting of the decayed soil, which had been taken off the ground

in former tillage, was placed in three more piles, and each of these received also three cart load of sand, but no salt, on account of the apparent richness of the earth. Half the field was manured with the four first piles; but the three last not being sufficient for the other half, what remained without manure was sown with salt, at the rate of ten bushels to an acre.

That part of the field where salt had been used, either mixed with earth or alone, produced about half a crop of turnips, but the crop totally failed where there was no salt.

In 1792, three acres, which in 1791 had borne a crop of wheat, not exceeding twelve bushels on an acre, were ploughed before Christmas, and brought into fine tilth by midsummer following. On each acre were sown twenty bushels of salt, excepting that two ridges towards the middle of the field were purposely left without any salt; on these two ridges the turnips totally failed, but the remainder of the field produced a plentiful crop.

In 1793, four acres of land, completely worn out by successive tillage, were ploughed before Christmas; three acres were sown with salt, at the rate of twenty-five bushels, and the remaining acre with eighteen bushels, without any other manure. The crop was in general a good one, but visibly best where the greatest quantity of salt had been used. Since that time, crops of turnips have been raised, with equal success, by the use of salt; and in the severe winter of 1794-5, it was observed,

that these turnips were much less injured by the frost, than others similarly treated and cultivated in the common way. The writer of the account suggests, that if turnips are less injured by frost when they are manured with *salt*, than when they are cultivated in the usual manner, it must indicate an extraordinary degree of health and vigour in the plant; but a single observation is insufficient to establish such a fact.

The free use of salt, in the culture of the CARROT, has also been found very efficacious. The effect of enlarging the growth, and consequently increasing the crop of all esculent vegetables, has long been known to all the gardeners in America. Sir John Sinclair likewise informs us, that drilled carrots grow well in a salted bed, the salt being laid under the surface, in the centre of the intervals between the rows, and at some distance from the roots, in such manner, that it may be dissolved before the fibres of the roots meet it. See Husbandry of Scotland, 2d edition, vol. ii. Appendix, p. 182.

Some years ago, Baron Humboldt discovered, that a weak solution of any of the oxymuriatic salts has the property of accelerating and increasing the growth of vegetables. This effect is probably owing to the circumstance of the oxymuriates being converted by exposure to the air into common muriates. It might, however, be within the scope of your Society's plan and intentions to offer premiums to such gardeners as would willing-

ly make farther experiments on bleachers' residuum, an article which may be had for little or nothing, and which, if divested of the sulphate and muriate of manganese, which is always contained in it, would doubtless prove a very powerful and beneficial manure.

A gardener of considerable celebrity at Chorley in Lancashire, of the name of Beck, made use of common salt in his extensive gardens for upwards of thirty years, especially upon his ONIONS, and he found, that the application of this salt, very far surpassed that of all other manures. He never took any care to ascertain the exact quantity of salt which he employed; but when he was questioned as to this point, he said, that he thought he was accustomed to use it in the proportion of about sixteen bushels to an acre of land. His practice was to sow the salt immediately after he had covered in the seed, a point which should always be attended to, because it has been found, that, if the salt be sown after the plants show themselves above ground, the whole crop will inevitably be destroyed. On the contrary, if a moderate quantity of salt be sown upon the land, as soon as the onion seed is deposited in the ground, say about six pounds to one square perch of land, or four ounces to a square yard, the result will not fail to be striking and advantageous.

The general failure of the onions last year has been much spoken of, but I do not hear of a single gardener that employed salt, who had not a very abundant

crop. As a corroboration of this, I may refer to the letter of Mr William Morton of Biel, which was read to our Society on the 8th of September last, and which states the benefits he had derived from the use of brine, made by the solution of common salt in water, and which he had applied to his beds of onions, shallots and other roots. I shall, however, have occasion, before I conclude this address, again to refer to Mr Morton letter.

Seeing that common salt produces such striking effects in the culture of potatoes, turnips, carrots, onions, shallots, &c. I cannot help being surprised that it has not been brought into general use long since, especially as I observe, that more than 200 years ago, the Lord Chancellor Bacon, in the most unequivocal manner, recommended its employment in the practice of horticulture. His words are these: "Several herbs, such as radish, beet, rue, pennyroyal, like best being watered with salt water; and I advise the extension of this trial to some other herbs, especially those which are strong, such as mustard, rocket, and the like." *Lord Bacon's Natural History.* I must, however, now proceed to the consideration of the effect of salt in the cultivation of fruits.

The action of common salt upon FRUIT-TREES, when judiciously applied, is equally beneficial. In cyder countries it has been the practice on some estates, where the owners have been ambitious to have fine orchards, to dig a small trench, a few yards distant from each apple tree, and to

put within it a small quantity of salt, which, by means of the rain, becomes dissolved, and is gradually conveyed to the roots of the trees. This practice is said to increase the quantity of the fruit, and to preserve the trees in the utmost health and vigour.

Mr Hollingshead, whom I have before mentioned, and who studied this subject for many years, remarks, that " Those farmers who reside near the sea-shore, might derive considerable advantage from watering their grounds with sea water, or sowing them with sand from the beach, below high water-mark, during the spring and autumn, as the particles of salt contained therein would be a great benefit. Fruit-trees," says he, " and the hop plant, should also be sprinkled with sea water, or have salt, or sea sand, laid about them, at some distance from their stems. The cotton tree and sugar cane, in the West Indies, would also derive considerable advantage from this mode of treatment." Page 21.

There is a very striking experiment on record, which was made by the late Mr Gilbert, steward to the late Duke of Bridgewater, on the effect of common salt upon apple-trees ; and from my own knowledge of that gentleman, I have no hesitation in saying, that I believe the account may be strictly relied upon. This gentleman, who was not only steward to the Duke, but also a large salt manufacturer, had an estate contiguous to his salt-pits at Wincham in Cheshire, on which was

an orchard planted with apple-trees, which, being grown old, constantly bore in the spring a profusion of blossoms, but never brought any fruit to perfection. To remedy this defect, the tenant spread a quantity of rock-salt, bruised small, about each of the trees, at some distance from their stems; and ever since that period all the trees in that orchard have continued to be very productive, yielding abundance of fine, large, and well-flavoured apples.

A merchant at Liverpool, with whom I am well acquainted, has sent me an extract from a letter which he received from a very respectable correspondent, on the state of the fruits in the gardens at Droitwich, a town in Worcestershire, which is one of the most considerable places in Great Britain for the manufacture of common salt. It runs thus:

"It is a remarkable circumstance, and worthy observation, that about the 15th of July, when the small fruit began to fail, and become scarce in the markets, in consequence of the great drought, the fruit in the gardens at Droitwich had not the least appearance of the want of rain, but, on the contrary, was in a state of the greatest possible luxuriance; and I am certain I speak within compass, when I say I could have gathered hundreds of clusters of currants that would have weighed half a pound each. The stems of the bunches were so long and numerous in the clusters, and the currants so large, I remarked to

my children who were with me, that I was convinced their appearance, so different from every other place at the same time, arose from the presence of salt in the atmosphere, occasioned by the boiling of so many pans at the salt-works here."

In addition to these facts, I am desirous of remarking, that the employment of common salt in agriculture and horticulture is much more frequent in foreign countries than it is in these kingdoms; for I have the most unquestionable authority for stating, that "Salt is employed in the cultivation of the vine and other fruit-trees on the borders of the Rhone, and that they are improved by this application."

Most of the persons who have borne testimony to the beneficial effects of common salt in horticulture, have observed, that salt has the property of attracting moisture from the atmosphere, and hence it is possible much of the important results may be derived. It is probably owing to the property which salt has of absorbing moisture, that it is customary, in bringing the cuttings of curious *vines from abroad*, to dip them in salt water before they are put on board. I have indeed been assured, that cuttings of the myrtle and other shrubs may be brought from a distance, with more certainty of their living, if they be previously dipped in a solution of common salt. Cuttings of the weeping-willow, the Salix Babylonica of Linnæus, which is a native of the east, could never

be brought into this country alive, until the expedient of steeping them in salt water was adopted.

Requesting to be forgiven for these digressions, I shall conclude this branch of the subject in the words of a late venerable writer, who had probably made more experiments on the effects of common salt in horticulture, than any other individual in Great Britain. "Every thing," said he, "that is sown or planted in a garden or hothouse, should have a quantity of salt sown on the surface of the ground round it. By thus regularly forcing vegetation with salt, all the productions of the field and garden would be brought to maturity three weeks or a month sooner than they are by the present method of cultivation, as well as the various grains being much improved in weight and solidity, and the fruits in richness and flavour *." Sir John Sinclair, in quoting this passage, remarks, that "the advantage which is derived from the application of Dutch ashes, (so full of saline particles), to the gardens in the Netherlands, is a full confirmation of this doctrine."

The SECOND property which I have assigned to common salt, when employed in the cultivation of a garden, is that of rendering esculent plants and fruit-trees unfit for the food or the habitation of worms and insects. Upon this, and the re-

* Hints to Country Gentlemen, &c. by John Hollingshead, Esq. 3d Edit. p. 19.

maining branches of the subject, I must, however, be very concise, else I shall extend this paper to too great a length to be read at a single meeting of the Society.

The farmers who reside in the counties near the metropolis, and in several other districts in England, never put their seed-wheat into the ground, until they have first steeped it in a very strong solution of common salt, as they find this to be a specific against the rust or blight in wheat, and that it prevents insects from preying upon the seed. As this practice is so efficacious in preserving seed-corn, why should it not be adopted with garden seeds, such as those of onions, carrots, turnips, radishes, celery, parsley, and the like?

The HONEY-DEW, which every year makes great havoc with fruit-trees, is, I believe, occasioned by small insects; and this may be entirely prevented from appearing, by strewing the borders where the trees grow with common salt. Ants never appear in those parts of a garden where salt has been properly strewn; and how destructive these little animals are to trees, as well as to fruit, is well known. I have no doubt but that the fly in hops might also be prevented by the proper use of common salt.

Last year a gentleman called upon me from the Cape of Good Hope, to ask me if I could contrive any method of destroying an insect which attacks the vines in that colony, and produces incalculable

mischief. He informed me that this is a peculiar insect, about the size of the millepedes, or common wood-louse, which creeps up the vines, and does so much mischief, that some plantations are rendered quite unproductive by it. Every crop would indeed be entirely destroyed, were it not that the proprietors of the estates keep a great number of women and children to pick off these vermin. These singular insects burrow very shallow in the ground, in the day time, say half an inch under the surface, and in the evening they come up upon the trees. The female slaves and their children go every night to the proprietor, carrying with them in their hats the produce of their industry, which he examines separately, and then empties it into a tub of water, which stands by him for the purpose. The slaves and children are then rewarded according to their deserts and the quantity of insects which each brings in, while the careless and indolent are proportionably punished. My informant assured me, that the ravages of these insects, the great number of hands that are required to destroy them, and the high price of labour at the Cape, have prevented the cultivation of vines, and the consequent improvement of the colony, more than any other circumstance. To extirpate these creatures, I advised salt to be spread upon the surface of the ground in which the vines are planted, and I am promised an account of the result of the experiment. Should I receive this,

I shall not fail to communicate the same to the Society.

It is not a mere speculation that common salt will prevent the ravages of worms and insects in gardens, for it has so often been tried by gardeners of experience, that no doubt can remain on the subject. More than fifty years ago, Mr Thomas Hitt, who was gardener to Lord Robert Manners at Bloxholme in Lincolnshire, and afterwards to Lord Robert Bertie, at Chislehurst in Kent, published a very interesting work on the Management of Fruit-trees, in which he gives a variety of directions for the use of common salt, founded upon the experience of many years practice. This work is written with so much modesty, and is throughout so totally unassuming, that one feels inclined to receive his testimony without hesitation. The following brief extracts will, I trust, be interesting to the Society.

"I have," says he, "observed two sorts of CATERPILLARS feed upon fruit-trees, the one black, and the other green; the *black* generally make their appearance in March, if the season be dry, upon the pear-tree, apple, and several others. The green caterpillar that feeds upon fruit-trees, for ought I know, may be the same as those that were black at their first appearance, but by green food their colour may be changed; but I have found them very prejudicial to both the young branches and fruit of the apricot, cherry, plum, apple, pear,

currant, gooseberry, &c. When the caterpillars are first perceived upon wall or dwarf trees, I have prepared a brine, the same as for washing of walls at the time of pruning, and therein dipt a brush or besom, and swept the trees all over; this has destroyed many, by beating some off and killing others. This should be often repeated in dry seasons." Page 266,–269.

On preserving fruit upon standard-trees from being destroyed by caterpillars, he remarks, that "As most noblemen have, at their seats, engines for extinguishing fires, which are very proper instruments for watering orchards, or such trees as cannot be reached with a brush; if orchard trees are watered all over with these engines two or three times a week, it will destroy many of the caterpillars. This should be done in the heat of the day, for then they hang the loosest upon the trees; and the water should be mixed with salt. This work is not only necessary when the trees are in blossom, but also before and after." Page 272.

"The HONEY-DEW," says he, "is a glutinous substance, very prejudicial to many kinds of fruit-trees; for it contracts the minute vessels of their most tender parts, and prevents their imbibing and perspiring such fluids as are required in vegetable life. A few days after the honey-dew appears, you may discover small insects on the underside of the leaves that are shrivelled, almost without motion; yet the heat of one fine day will

make them visibly increase both in bulk and strength, and likewise in number." He adds, the honey-dew "retards the motion of the sap at the extremity of the branches, and this prevents the fruit below from coming to any tolerable perfection, and damages the young branches to such a degree, that they are never after capable of bearing good fruit. Besides, many trees are entirely killed thereby, if proper methods are not used to prevent it. Though different kinds of SMOTHER-flies, or those of different colours, are found upon different sorts of trees, yet as they all are either bred from, or feed upon the honey-dew, all trees require the same care and management, to preserve them from these evils; for no tree prospers well when either the honey-dew or smother-flies are on the extremities of its branches."

The remedy which he proposes for these evils is nothing more than common salt, administered in the following manner: "If the season be wet, spread common salt all over the border, about eight ounces to each tree; for the more salts the juices contain which form the young branches, the more compact and smooth their leaves will be, and thereby less subject to the penetration of the honey-dews. If trees are thus ordered at all times, when the honey-dew appears on them, neither it nor the flies can ever do them much injury." The foregoing paragraphs are taken from the chapter directing how to treat trees in *new*

borders. In that "of the honey-dews and smother-flies on fruit-trees growing in *old* borders," he has the following remarks: "If the borders be impoverished, by having either too much kitchen stuff or flowers growing upon them, the trees will be too weak; and if the weather be dry, they must be watered plentifully three times a week, with one ounce of salt added to each gallon of water. If the fly be strong, double the quantity of salt, and water the bottom of every tree before the soot or lime is laid on at the time of trenching; but if there is not an opportunity of trenching, nevertheless water thus mixed (with salt) must always be used for the above purpose."

"I have found these methods successful, even when the flies have been very strong upon the trees, and have in a few days destroyed many of them, and caused the trees to shoot vigorously." In obstinate cases, he directs to dissolve two ounces of salt in a gallon of water, and with this mixture to brush the trees all over, beginning at the bottom of the tree, and making all the strokes upwards. This, he says, will cause all the infected leaves to drop off the trees, but will not injure the healthful ones, but occasion the trees to make good shoots after, even such as will produce fruit the next year on peaches and nectarines." Pages 279,—281.

On the destruction of fruits by ANTS, this interesting author gives the following important directions: "The ants," says he, "are much complained of for destroying fruit and leaves; but when borders are rightly prepared and ordered they cannot live; nor in old borders, after they have been trenched and watered with the composition mentioned for that purpose. Against old walls, either of brick or stone, they are the most troublesome, for as they lodge in the nail-holes, the watering of the borders only has no effect upon them; but the *walls* should be watered all over with brine, made by adding two ounces of salt to a gallon of water." Page 282.

During a journey in the summer and autumn of last year, through the north of England, and part of Scotland, I heard repeated complaints of the failure of the onion crops, which were said to be destroyed by the wire-worm. This was more particularly the case around Edinburgh, and throughout the county of Fife. Letters from home also informed me, that in the neighbourhood of London onions were so scarce for a month or two, from the same cause, until foreign onions were obtained, that they were sold in Covent Garden market nearly as dear as peaches. It gave me, therefore, much pleasure, happening to be at Edinburgh at the Anniversary Meeting of our Society, to hear the communication from Mr Morton, a gardener in the neighbourhood of Dun-

bar, who informed us by a letter, directed to the Secretary, that he had preserved his crop by the use of salt-water, while those in the gardens around him were all destroyed.

THIRDLY, common salt is not only a preservative of plants and trees from the ravages of grubs, worms, and insects, but it is one of the most effectual substances that can be employed in a garden for the DESTRUCTION of these animals themselves. Of the truth of this assertion any one may satisfy himself in a very short time by direct experiment. If a small quantity of salt be sprinkled upon a common earth worm, its destructive effects will be seen to be almost immediate. Its action on worms is also very strikingly exemplified by its effect on the hirudo, or common leech. When this creature has been employed in supplying the place of the lancet, it is usual to put a small quantity of salt upon it, so as to touch its mouth; this occasions the leech instantly to disgorge all the blood into the plate on which it is laid, but if too much salt be used, or if the leech remain in contact with it too long a time, the salt is apt to prove fatal: Hence some of the people who bleed with leeches, prefer taking the blood from them by pressure, rather than risque the loss of them by using salt. The Right Honourable Sir John Sinclair, in a valuable paper which he has lately published, thus explains the operation of the salt. "Salt" says he, "destroys vermin in the ground,

by making them void the contents of their bodies, such evacuations being too powerful for them to withstand. It has," he adds, " this additional advantage, that the vermin thus become food for those very plants which otherwise they would have destroyed."

The eminent John Evelyn, the celebrated author of Sylva and other interesting works, and who himself was very zealous in the improvement of the art of horticulture, had learned the effect of common salt in destroying slugs, worms, and other creeping vermin, as appears from a paper in the first volume of the Practical Husbandman and Planter, octavo, 1733, page 58; but it does not appear that he had regularly employed it for that purpose.

From an Essay on Plantership, published by Mr Samuel Martin of the Island of Antigua, it appears that common salt has been employed in the West India Islands for the destruction of grubs and insects. " Soils," says he, " which are subject to the grub, and must be fertilized by common dung, which is a proper nest for the mother beetle to deposit its eggs, should be well impregnated with the brine of dissolved salt, after the dung is first cut up; two large hogsheads of salt will make brine enough for a dung-pan of fifty feet square. This cure for the grub is a late discovery, for which I am obliged to a judicious planter, and which I have tried with success."

" A land-surveyor of high character in my neighbourhood," says the Right Honourable Lord Kenyon, in his evidence delivered before the Board of Trade, " considers that the use of salt would be likely to be very valuable in destroying the slug, wire-worm, snail, &c. which often destroy even whole crops. He also well remembers that salt was used largely in the neighbourhood of the higher and lower Wiches in Cheshire, before the duties were raised to their present height."

This is confirmed by a writer in Dr Rees' Cyclopedia, under the article " Salt," who says, that " in Cheshire and other counties, they make a great use of the water of their salt springs, as a manure for their lands." He adds, " They let out the water of these springs for a certain time upon the lands, after there has been rain, and by this means the quantity of salt they contain is so blended with the rain water, that it is too weak to hurt the corn or grass, and yet strong enough to kill worms and other vermin, and to improve vegetation."

The FOURTH property which I have assigned to common salt, when employed in horticulture, is that of DESTROYING WEEDS and other noxious vegetables. On this part of the subject the evidence is not so abundant as I could have wished; the following testimonies however do, I think, deserve attention.

The author of an essay on the effect of salt on vegetation, published in the first volume of the Practical Husbandman, before quoted, expresses himself thus: 'I am well assured from a Scotch gentleman, that they have long used salt in that part of Great Britain, always sowing ten or twelve bushels by hand, of their coarse salt, on an acre of young green wheat, some time in November, December, January, or February, it being, from the several accounts which I have had of it, very effectual in the killing of tender weeds amongst corn, yet at the same time cherishing the corn, and adds much to the goodness and plumpness of the grain." Page 48.

Bishop Watson, in his Chemical Essays, says, that "in Cheshire, wherever the soil abounds with RUSHES and weeds, it is customary to lay a quantity of rock-salt upon it to destroy them." Vol. ii. p. 73.

Gervase Markham, the well known writer on rural affairs in the middle of the seventeenth century, strongly recommends the use of salt as a manure for land, in his book, entitled, "A Farewell to Husbandry;" and concludes his observations by remarking, that "there is nothing which killeth weeds and other offences of the ground so much as saltness."

Major John Taubman, speaker of the House of Keys in the Isle of Man, in giving his evidence before the Board of Trade, in the year 1817,

states, that " he has used refuse salt as a manure on meadows, with advantage; it was sown thinly by hand,—cannot speak to the quantity used; the meadow had been much covered with MOSS, which the dressing of salt entirely destroyed."

" Mr Sickler made a little heap of earth in the midst of a field, on the top of which a cart-load of refuse salt was thrown; the earth in the heap itself, and, after its removal, the earth under it for upwards of two feet deep, to the clay, was rendered so perfectly barren, that the most common weeds would not vegetate in it. This barren earth, however, furnished the richest dressing for the remainder of the field*."

I have now laid before you all the evidence which I have been able to obtain on this part of the general question,—the use of sea salt in horticulture. I am, however, fully sensible that, although enough may have already been proved for us to form the decision, that the use of salt in gardening is essential, there are probably many well established facts which have not yet come to my knowledge, and from what we have already attained, we may presume that our information on the subject is yet very limited.

To employ this very valuable mineral substance in the best possible way, much is to be acquired

* Case of the salt duties, by Sir Thomas Bernard, Bart, page 275.

by practical knowledge, by direct experiment, and by vigilant observation. Every distinct vegetable, whether in the state of seed, root, or more mature growth, from the plant to the largest fruit-tree, may possibly have its distinct habitude and peculiarity. Some may require more, others less: Some may admit of an immediate application, while others require the salt to be laid on at a little distance. In short, it is obvious that, since the general benefit of the practice which I have endeavoured to impress upon your notice has been substantiated by experience, we have now nothing more to follow than experimental researches.

As a manure for land, sea salt is considered of so much importance by the Board of Agriculture in London, and by the Highland Society of Scotland, that both these associated bodies have offered premiums for experiments on the subject. The offer from the Board of Agriculture is announced thus: "To the person who shall make and report to the Board, the most satisfactory experiments to ascertain the advantages or disadvantages which have attended the use of salt as a manure, either simple, or mixed with other substances;—The gold medal or fifty pounds. Accounts to be produced on or before the 1st of March 1820." The Board adds: "It is to be hoped that this premium will excite a laudable spirit among enterprising farmers, to ascertain particulars of such importance to the agricultural interest."

The reward held out by the Highland Society of Scotland is, " To the person in Scotland who shall make and report to the Society the best and most satisfactory experiments on the effects of salt as a manure in general,—A piece of plate of thirty guineas value, or that sum in money. The reports to be lodged with the Depute-Secretary on or before the 10th of November 1820."

From the interest which I have long taken in this subject, and the share I have had in obtaining the late act of Parliament, for lowering the duty upon rock-salt for the purposes of husbandry, I felt much pleasure and satisfaction on seeing these premiums announced to the public ; and I am inclined to hope that the late concession of the Legislature will prove the forerunner of a total repeal of all the existing laws relating to Salt, and that the offer of these premiums will occasion such a spirit of emulation among the farmers, as must conduce, in an eminent degree, to promote the improvement of agriculture. Greatly do I wish that the Horticultural Societies of London and Edinburgh may attach a proportionate degree of importance to the employment of common salt in their experimental researches, and thence be induced to offer such premiums as cannot fail to stimulate the exertion and attention of all our rational and scientific gardeners, so as to lead their inquiries towards the investigation of this very in-

teresting and curious subject. Should the foregoing collection of facts have the least tendency to invite the Council of the Caledonian Horticultural Society to institute such a prize, I shall derive considerable satisfaction from the circumstance of having suggested a measure so important, in every point of view, to a great majority of persons, of all classes, in the British dominions.

II.

An account of several of the most important Culinary Vegetables of the interior of the Russian Empire; with remarks upon their Cultivation, their application to the purposes of Life, and the manner in which they are preserved during the severity of the winter in the northern parts of that Country.

By William Howison, M. D.

(*Read 4th March* 1819.)

1. *The Russian Cucumber,—a small smooth species for salting.* (Seed from J. Rowan, Esq. banker, Moscow.)

The cucumber is a vegetable consumed in large quantity by the native Russians, as also by foreigners settled in the country, both during the summer, in its recent state, and when artificially preserved during the winter. It is cultivated in great profusion in the fields, wholly in the open air, during the short but warm summer of Rus-

sia, and in the public-kitchen garden ground surrounding the great towns. It is, in general, planted in long rows, along with cabbage,—a cabbage and a cucumber plant placed alternately constituting the row. The cucumber is also to be met with in abundance, in the gardens of the better class of peasantry, throughout the villages of the interior; and in those of the higher orders sometimes in the open air, at other times under glass, which is remarkably cheap in Russia, as it pays little or no duty.

The Russian cucumber differs, in many respects, from that of Great Britain. The leaf, and whole plant in general, are much smaller and contracted; the fruit, when it has attained its full growth, is short, thick, containing a great quantity of juice and pulpy matter; and from these last-mentioned qualities, is much better adapted for *salting*, (the only way in which the cucumber is preserved during the winter throughout Russia), than the common cucumber of this country. It may perhaps be thought unnecessary for me to mention here, that the cucumber plant requires a rich soil, or ground well dunged, for its cultivation. The Russians of all classes appear to pay particular attention to this, surrounding the root of each plant with a large circle of horse or cow dung.

For winter's use, the cucumber is preserved in salt, as already noticed; and, prepared in that way, it forms an excellent cooling article of diet, which

is not only consumed in great quantity by the lower classes, but is also daily to be met with at the tables of the nobility, and of foreigners of every description settled in the country. Before those salted are eaten, the thin green-coloured outer-skin is removed by the knife, when the interior is found remarkably pulpy, juicy, and pleasant to the taste. The liquid which is accumulated around them in great quantity, which is charged with the salt, and with the soluble portion of the vegetable matter, and which fills the casks in which the cucumbers are preserved, is not unpleasant to the taste, and is used by the native Russians as a gentle cooling laxative in fever, about a tumbler to a doze.

As the seed of the Russian cucumber has now found its way into Britain, and has been cultivated in Scotland with success, I shall subjoin here a very accurate receipt for the preparation and salting of cucumbers. This receipt was procured for me, by the kindness of Mrs Dr Crichton, from one of the most experienced Russian cucumber-salters in St Petersburgh, and I am not without hopes that it will form a most useful and salutary addition to our British cookery.

" Take 1000 cucumbers; weigh out 7 lb. English of salt, which has been previously well purified and dried. Mix the salt well with a quantity of cold soft water, sufficient to cover the cu-

cumbers; 500 of which may be put in one small tight-made cask.

"Have ready plenty of the following leaves, which have been gathered when the weather is dry: Oak leaves, black currant leaves, cherry leaves, dill leaves and heads. Mix them well together, and place a layer of them at the bottom of the cask, then a layer of cucumbers, and thus alternately, until the cask be completely filled. Then pour on the salt and water till it rise to the brim, and close the cask tightly. Some people like a small bottle of vinegar, and a very small bit of garlic, to be added to each cask."

In two or three months the cucumbers are fit for use, and are brought to table entire, floating among the juice and leaves which surround them whilst in the cask. In Russia, they seldom appear at table until the month of November or December, when the winter has completely set in, as they must remain in the cask for two or three months, in a cold place, from the time that their preparation is first set agoing, until they are ready for use, in order that the salt and water may have sufficient time to act upon the vegetable matter of the cucumber, and of the various species of leaves employed in their preparation. A Russian will often eat several of the cucumbers, salted in the above-mentioned manner, during the course of a meal; and no bad effect is ever known to arise from their use.

Whilst visiting, during the month of May 1818, the hot-houses belonging to the Taurida Palace garden, St Petersburg, under the direction of Mr Cole, a very intelligent and experienced native of this country in the art of horticulture, I saw the shoots or branches of a number of cucumber plants, both of the Russian kind, and of that common in Britain, tied up to wooden rafters or palings, in the manner of vines, currant-bushes, &c. The plants treated in this way appeared to be remarkably strong, and the fruit was very large.

Whether the cucumber of this country would answer for salting in the above-mentioned manner, I have not yet put to the test of experiment. The great objection, it appears to me, would be its containing too much fibrous matter, and so little pulp and juice. Although they possess this variety of cucumber in great abundance in Russia, I never met with it salted.

II. *Moscow Early Yellow Turnip.*—(Seeds from Mr Rodgers, British Agriculturist, settled upon Count Romanzoff's estate near Moscow.)

This is a small flat-bottomed turnip, with a short thin tail or root issuing from its centre, with firm dense reddish coloured flesh. It is produced in great abundance in the neighbourhood of Moscow, and in the Crimea.

III. *Narva Yellow Turnip.*—A kind peculiar to the neighbourhood of Narva. (Seeds from J. Booker, Esq. Cronstadt.)

The Turnip in all its different varieties is a vegetable used in considerable quantity as an article of food by the Russian peasantry, in the various governments of the interior. They particularly use the small species of yellow turnip above described, as having a fine dense reddish coloured flesh, with a completely flat bottom or under surface, and a small root issuing from its centre. It is known amongst the British residents in Russia by the name of the Moscow Yellow Turnip, as it is peculiar to that part of the Russian Empire. When cooked, and prepared for table, it is remarkably rich and well flavoured. The turnip is also one of the vegetables constantly to be met with in the garden of the boor, and in some of the southern districts of the empire, it is to be found growing in its wild or original state.

The native Russians do not boil their turnips, as we do ours; they either eat them in a half raw state, cut down into small pieces, in their stews or soups, or roast them, covered well over with the fir wood or birch tree ashes of their stoves, in the manner in which children often roast potatoes in Scotland. This mode of cooking adds greatly to their taste and flavour, by driving off the superfluous watery particles.

By undergoing the process of roasting, in place of boiling, the turnip is greatly improved in flavour and richness; in that state it resembles a good deal the Jerusalem artichoke, and when eaten with melted butter, pepper and salt, it forms a most excellent and highly nutritive dish, particularly for supper. Since my return to Scotland, I have repeatedly used the common yellow turnip of this country, not being able to procure any other roasted in place of boiled, and found it to answer nearly as well as that of Russia. Any person can easily convince himself of the accuracy of this statement, and I would recommend him to do so. The turnip ought to be previously well washed, and slowly and gradually roasted, by being completely covered up with heated sand or fine ash-dust. If the yellow turnip of this country be used for roasting, it will be proper to pick out the smallest and firmest. This will apply particularly to those produced in the open field, as they commonly attain, in this country, from the force of manure, to a very great size. From one to two hours will be necessary, according to the size, to roast them completely through; this is known to be accomplished by the interior feeling completely soft under the firm tough outside skin, and yielding to the pressure of the hand. They are then to be taken from the fire, carefully cleaned with a dry cloth, and brought to table. By the natives of Russian Finland, turnips are often used as a substitute for

bread. Few or none of them appear to be used by the native Russians in the feeding of cattle. The Seotch families settled in the interior use them in broth, and boiled along with animal food.

IV. *Variegated Cabbage.*—Brought by Krusenstern, the Russian circumnavigator, from the Islands of the South Sea, and since that time cultivated in Russia. (Seeds from Mr Rodgers, Moscow.)

The common yellow-hearted cabbage is a vegetable also consumed in great quantity by the native Russians, both during the summer, and artificially preserved during the winter months. To supply them with a sufficient quantity of these, large fields are planted in the manner formerly mentioned, when speaking of the cucumbers, in the neighbourhood of all the great towns and villages. During the summer they consume the cabbage in its natural state, either half raw in the form of soups, or slightly boiled. And in order to preserve it for winter's consumption, during which period by far the greatest quantity is used, the Russians cause it to undergo the process of partial fermentation, or form what is denominated *sour-krout.* As this valuable dish not only forms a very important part of the winter food of the Russian boor, but is also to be met with daily at the tables of the nobility, and foreigners, parti-

cularly the Germans settled in the country, as it is nutritive and healthful, and procured at little or no expence; as it might form no unenviable addition to the food of the peasantry of Great Britain in years of scarcity, or in the event of failure of the potato crop, the staff of life, and principal support of the poor; I shall here describe the manner in which it is prepared, in hopes that it may afford a useful addition to our domestic cookery.

Every Russian family, from that of the boor to the nobleman, as also the foreigner settled in the country, for the supply of their numerous native servants as well as themselves, lay in their stock of cabbage, or make their sour-krout, about the month of October, before the setting in of the winter frost, and prepare it in the following manner: They take a large strong-made wooden vessel, or cask, with which every family is furnished, in resemblance of the salt-beef cask of the Scotch farmers, capable of containing as much as is sufficient for the winter's consumption of the family. They then gradually break down or chop the cabbage, deprived entirely of the loose outside green leaves, into very small pieces, beginning with one or two cabbages at the bottom of the cask, and adding others at intervals, pressing and rubbing them by means of a wooden spade, against the sides of the cask, when they crumble as it were into a rough unequal powder, until

the vessel is nearly full. They then place a heavy weight upon the top of it, and allow it to stand near to the peach stove, or any other warm place, for four or five days, by which time it will have undergone fermentation, and be ready for use. Whilst the cabbage is passing through the process of fermentation now mentioned, a very disagreeable heavy fetid acid smell is exhaled from it; and this is strongly perceptible to the olfactory nerves of a person passing near the outside of the house in which the preparation of the sour-krout is going on. They then remove the cask to a cool situation, and keep it always covered up. Aniseeds are strewed among the layers of the cabbage during its preparation, and they communicate a peculiar flavour to the sour-krout at an after period.

In the boiling of the sour-krout, and preparation of it for the use of the table, two hours are the least period which they allow it to be on the fire, and it forms an excellent, nutritious, and at the same time agreeable antiscorbutic for winter use. For the greater part of the year, this article, in one form or another, supplies a daily dish to the table of the Russian peasant. It may be made use of, forming a separate dish by itself, made into soup, or along with boiled animal food.

La Fontaine, in his account of the way of living and diet of the Poles, who, from the late change of events in the state of Europe, may now be considered

as subjects of the Russian Empire, gives the following account of a national species of food amongst them, in which what he calls the red turnip and cabbage, made into sour-krout, forms a material part, and which is well deserving of particular notice. "There is a soup, called Barszes," says he, "in which barley or groats are boiled with red turnips, or cabbage made sour, and which affords at once a well tasted and wholesome food. It is, above all things, to this mess that the Pole is indebted for being less liable to scurvy, from the foul air that he breathes in his narrow strongly heated room, than he otherwise would be. And still less would he feel it, if intemperance in drinking was not so much greater among the vulgar than in any other country."

During the very severe and long winter which prevails throughout the northern parts of the Russian Empire, the inhabitants and resident foreigners possess a method of preserving the cabbage, and various other vegetables, in their fresh state, in the soil in which they were originally produced, for many months; and this they do, when the temperature of the atmosphere is as low as 22 degrees below the freezing point of Reaumur's thermometer, the one in general use throughout the Russian Empire.

I shall now proceed to describe the process as it presented itself to me last winter in the garden of J. Booker, Esq. at Cronstadt. All the cabbage which

remained after the making of the sour-krout, and which were intended for the winter's consumption in their fresh state, with various kinds of green kale, leeks, &c. were collected together in a part of the garden in which they were growing. The cabbage were sunk in the earth near to each other, up to within a little distance of the stock or head. A temporary structure, composed of long wooden boards, of considerable size, resembling in shape a melon frame, or the sloping roof of a house, raised to about four or five feet in height at one end, by means of a thick turf wall, and furnished with a door to enter by, was erected over the space of ground containing the vegetables. These boards were covered with a layer of dry straw, and above that a layer of course Russian mats, made from the bark of trees, and which are used to pack up furniture in this country. When the winter set in, the whole became covered with a layer of snow several feet in depth, and formed a covering which no intensity of frost was sufficient to penetrate. The gardener opened the door, which was also of wood, lined with a layer of straw, and another of mat, to allow us to enter. We found the enclosed space of ground nearly dark within; but by the assistance of the candle which we carried, and the light of the door, which, during the mild weather of the forenoon, is at times kept open to allow fresh air and light to enter, we could distinguish the cabbage and

other vegetables, looking fresh and beautiful, except the outside leaves of a few of the former, which presented a shining slimy appearance. The gardener told me, that he removed the outer leaves occasionally, to prevent them rotting and injuring the cabbage, and that they would preserve in this way in a state of perfection for the space of six months.

I may here state, that to the best of my recollection, the cabbages which I saw in Russia were of the early kind. Whether or not the shortness of the summer will admit of the growth of the winter cabbage in the northern parts of the empire, I am uncertain.

The potato crop dug from the earth, was preserved also in a curious way during the severity of the winter, with the assistance of fires occasionally; but this I shall describe at a future period, when detailing the purposes of life to which that useful vegetable is applied by the native Russians, and by foreigners settled in the country.

In bringing the consideration of the cabbage to a conclusion, I may be allowed to add an extract from *The Globe* London newspaper of the present month, January 1819, upon this subject. "A French journal," says the Editor of that paper, "observes, that the cabbage is a sovereign remedy for curing intoxication from wine, and that it has even the power of preventing it; for we are informed, that by eating a certain quantity of cabbage before dinner, we may drink as much wine

as we please, without experiencing any inconvenience. This property of the cabbage is mentioned by Aristotle and Theophrastus, who are of opinion it proceeds from the antipathy which the vine shews for the cabbage. If a cabbage be planted next a vine, the latter either retires or dies."

V. and VI. *Large Black Russian Radish, and Large White Raddish.* (Seeds from Mr Cole, Taurida Palace Garden, St Petersburgh.)

These two species of radish now mentioned, are always to be found constituting a part of the vegetable productions of the humble cottage garden of the Russian boor, and prove of material benefit to him during the frosts which occupy a great part of the year, and at which time a considerable quantity of them is consumed. These species of radish are also cultivated in considerable quantity in and around the principal towns, villages, &c. for the use of their numerous inhabitants. The Russians plant them in the spring of the year, as soon as their late winter, or the gradual dissolution of the snow leaving the surface of earth uncovered, will permit, by making holes in the ground with their fingers, or with a piece of stick, resembling those made by the dibble, and placing a single seed into each hole, which they then cover up with the earth. The one species of radish is of a black colour; the other is pure

white, and is by far the most generally met with of the two, being found in abundance in the public markets of St Petersburgh, and other great towns, villages, &c. and consumed at the tables of all classes of people, foreigners, &c. who give it the preference from its colour, its appearance, and from possessing a less degree of pungency to the taste than the black. Both species grow to a considerable length and thickness, resembling a carrot in shape; they are surrounded by a firm dense outside skin; are very hard and juicy, and also remarkably strong and pungent to the taste, exciting strongly the action of the salivary glands, and producing a considerable flow of saliva. The leaf of both species resembles the dwarfish leaf of the turnip. All classes of Russians, but particularly the lower orders, are remarkably fond of both these species of radish, and make use of great quantities of them. They cut them into circular slices, about an hour before they are going to eat them, and strew salt upon them in order to alleviate and destroy their acrimony and pungency. When the hour has expired, they pour off the water which has collected about them during that time, remove them to a clean plate, and then bring them to table. The boors consume along with them immense quantities of black rye bread and salt.

VII. and VIII. *Large Round dark-green Water Melon*, with red flesh; *Large Spotted Russian Water Melon*, with yellow flesh,—Natives of the coasts of the Black Sea. (Seeds from Mr Cole, Taurida Garden.)

The different species of water melon, or arbouse, are cultivated in surprising quantities in the southern parts of the Russian Empire, from the Don to the Ural, and particularly along the banks of the Volga, and their cultivation requires but little trouble. They only thrive in the open air, however, to the 52d degree of south latitude. The melon gardens in the above-mentioned parts of the empire, from their extensive size, might rather be called *fields*; they are surrounded with nothing more than a slight fence, just sufficient to keep off cattle, and are divided into long beds, between which, in the oriental style, little channels are raised or cut in the clay for watering the plants; and, for this purpose, the gardens are always laid out contiguous to a pool, or to running water. The melon comes early forward; and with little pains, the fruit is brought to an extraordinary size. They are treated with scarcely more care than the most vulgar field fruits, and yet, in every field, there are melons to be found weighing thirty pounds, and which, in point of succulence and mild flavour, cannot be excelled.

The water-melon plant grows with great rapidity. It sends out a most abundant crop of dark-green coloured, luxuriant, fresh-looking leaves, and also long juicy pale-coloured shoots or tendrils, of considerable thickness, which extend to a great distance, creeping along the surface of the soil. The fruit forms upon the fading of the flower; it is of a rich dark-green variegated colour, at times spotted, of an oval shape, and gradually increases to a great size. When ripe and cut into, its interior presents a pure white, spongy-looking structure, remarkably juicy; and, towards the centre, large dark coloured seeds, surrounded with a pale pink tinct, colouring the interior pulpy substance in which they are contained, and gradually losing itself in the white, make their appearance. When eaten, it is remarkably juicy, resembling the purest cold spring-water, and is excellently adapted as a refrigerant for allaying the thrist, and other disagreeable symptoms, incident to warm climates. It may be made use of either raw, along with powdered sugar, ginger, &c. or salted in the same manner as the cucumbers. The water-melon also possesses the advantage of preservation in its fresh state for a considerable period of time; and, from the firmness of its texture, it will bear, without injury, removal from the most distant parts of the empire to any other.

Water-melons, although they are annually sent to the great towns of St Petersburgh and Mos-

cow in abundance, and at a remarkably cheap rate, from the southern parts of the Russian empire, are also brought to maturity by forcing under glass frames, in considerable quantity, at an early period of the season, in the northern parts of Russia, and principally in the neighbourhood of the populous towns, and they ripen there remarkably well. What is principally necessary during their cultivation in this manner, is to take particular care *not to injure the very strong and creeping shoots, which the plant sends out during its progress,* as already described; but either to raise the frames and allow them to spread out into an adjoining one, or to keep them, by bending, entirely within its own, which, in that case, would require to be long and roomy. The former way, however, I should think preferable. It is from neglecting this, that the failure of the cultivation of the water-melon throughout Britain is attributed by the British and native gardeners throughout the Russian empire. If the shoots are in any way checked or injured during their growth, the plant is observed to suffer considerably, and the future progress of the fruit towards maturity is either interrupted or totally destroyed. Attention to this circumstance is of much more consequence than heat, as it is satisfactorily and daily proved in the northern parts of Russia; it is also well known, that the water-melon plant, propagated by the artificial heat produced by glass frames, will

flourish, and the fruit reach their full size, at the same temperature at which any of the common species of melon will do. My friend Mr Booker has them every season growing in great perfection among other melons, in his garden at Cronstadt, and merely from paying attention to this. Mr Cole has the same at the Taurida Palace Garden at St Petersburgh.

As the plants are remarkably strong and luxuriant, and send out very large leaves and extensive shoots, one is quite sufficient to fill a large-sized glass frame.

Water-melons are known to be ripe and ready, not by the smell, but by the peculiar sensation which they communicate to the human frame when struck, and this, I am sorry to say, my memory cannot assist me in describing. If they are allowed to remain adhering to the plant until the seeds shake within them, they will be found to be good for nothing excepting the future propagation of their species from the seed.

To conclude, " The ingenious inhabitants of Sarepta," says Professor Pallas, in his Travels through the South of Russia, " brew a kind of beer from their very abundant and cheap water-melons, with the addition of hops. They also prepare a conserve or marmalade from the fruit, which is a good substitute for syrup or treacle. Perhaps a tolerable wine might be made of melons by proper management."

I have entered thus particularly into my description of the water-melon, or arbouse plant, its natural and artificial cultivation, and the various purposes of life to which it is applied by the native Russians, from a wish to see it propagated, if circumstances are found to admit of it, in this country. I have still in my possession a few seeds of the species, which I should be happy to give to any person interested in them, and who has a proper opportunity for their cultivation.

When the external tough skin surrounding them is removed, and they are cut into slices, they may be eaten in their raw state with salt, in the manner of the common celery, and prove nearly equally good, although less juicy.

IX. and X. *Knoll, or bulbous-rooted Celery; Rothen or Red Celery.* (Seed from Mr Rodgers Moscow.)

The Knoll-celery has a bulbous, irregular, contracted looking root, resembling in some slight degree that of a dwarfish ill grown turnip. The roots are cut away as soon as the plant is completely ripe, when they are preserved in sand for the winter consumption. They are at times taken to sea by the Russian, Danish, and foreign men of war, as sea store; and when cut down, make an excellent strong-flavoured soup, during the whole winter. They are also used in considerable quantity by

private families, and form an important and valuable addition to the winter stock of vegetables. Both these two species of celery are cultivated in considerable quantity in Germany, Russia, and various other parts of the continent. The introduction of them into this country, if they shall be found to succeed, which there is every reason to suppose, and the application of them to domestic purposes, are objects much to be wished for.

XI. *A peculiar species of Mustard from Russian Tartary.* (Seeds brought from Sarepta, and near the Chinese Wall, by Mr Hassenkampf of the civil service, attached to the Russian Embassy.)

This species of mustard, I am informed by Mr Hassenkampf, is peculiar to that part of the country now mentioned, and is used in great quantity by the native Russians, as a seasoning to their dishes. He was much struck with its appearance; brought some of the seed along with him, and cultivates it every summer in his garden. As it was during the course of last winter when I visited him, and received the seed from him, and as I have never seen it growing, I can say nothing more concerning it.

Mustard, particularly the white species, is cultivated in the south of Russia, on a very large scale, where oil is expressed from it, after it has been decorticated in hand-mills, and the mealy part

which remains is used like English mustard; it is by no means inferior to the latter, and is exported to foreign markets. A great profit arises from this branch of rural economy; and it deserves to be remarked, that mustard generally produces sixty fold crops, and that the oil and flour of mustard exceed the value of wheat, in a similar proportion.

XII. *Siberian Honeysuckle*,—a native of Siberia. (Seeds from J. Booker, Esq. Cronstadt.)

The Siberian honeysuckle is a beautiful perennial shrub, which grows to a considerable height, and bears flowers the first year from the seed. It has a small green pointed leaf, and its branches are covered with delicate prickles, resembling the barberry-bush. It has a beautiful pale pink and white-coloured flower, issuing from the stem at the origin of each leaf, and it bears immense quantities of them, which are remarkably shewy. It flowers in the months of June and July. The flowers continue in vigour for a long period, and then are converted into seed, which are small, circular, of a black colour, shrivelled, and resembling Jamaica pepper. This honeysuckle forms beautiful hedge-rows round gardens or gentlemen's policies; and, from being a native of Siberia, is remarkably hardy, growing in the open air in great luxuriance, and with little attention paid to it. Mr

Booker had it last summer in great splendour, forming a thick dense hedge around part of his shrubbery and garden at Cronstadt, from about four to six feet in height, and so thick towards the root, as not to allow the smallest animal to pass through. I am not gardener enough to know whether it has reached Scotland as yet; if it has not, it will afford a considerable and valuable addition to the hardy shrubs of this country.

XIII. *A peculiar Species of Onion from Chinese Tartary.* (Seeds brought to Russia by Mr Hassenkampf of the Russian embassy. Of this species of the onion I can give no description, never having seen it myself.)

The onion, the leek, &c. may justly be denominated the favourite vegetables of the Russian boor, and these are to be met with, constituting the most abundant produce of the humble garden of the village isba. These vegetables are also cultivated, in great quantities in the fields surrounding the principal towns, to supply the great consumption of the inhabitants, of the men composing the Russian army, navy, &c. They are also cultivated in the gardens of the nobility and more opulent people, and of foreigners settled in the country. The Russian peasantry, during the summer season, eat the leek in great quantity, and almost at every meal, along with large slices of

acid black rye-bread, and quass, an acid liquor prepared from rye, flour and malt, by the process of fermentation. In the sea-port towns of the Russian empire, Revel, Cronstadt, &c. during the summer months, almost every sailor who passes a stranger has in his one hand a large circular loaf of black rye bread, whilst in the other he carries a bundle of leeks, and these, along with quass, constitute his daily subsistence at that season of the year. The same may also be said of the men composing the army, and of the peasantry in general; the pungent and acrid qualities serving as a substitute for the watky or fermented spirit, which their scanty finances do not at all times (although by far too often) enable them to procure. These vegetables now mentioned also enter into the composition of their soups and other dishes.

As it is my intention, at a future period, to go on with the consideration of the potato, the pea, the berries or fruit of the mountain-ash or rowan-tree, the seeds of the papaver somniferum or poppy, and the chiccory plant or artificial coffee, with their application to the various purposes of life, and the preparations derived from them by the native Russians, I shall now bring the subject of the present paper, which has already extended to a sufficient length, to a conclusion, by communicating to the Society two Russian receipts; the one for preventing mildew upon fruit-trees, the other for

preventing gumming, or the spontaneous exudation of the gum, which proves detrimental and destructive to the fruit-trees in the Russian hot-houses; both of which were given me by Mr Cole, the Emperor's gardener at the Taurida Palace of St Petersburgh. Mr Cole assures me, that he has made use of these two receipts, with the greatest success, in the extensive hot-houses of the Taurida garden, ever since he first became acquainted with them, and has never found them fail in fulfilling the purposes for which they are respectively intended. Whether or not they are already known in this country, and whether or not these two diseases now mentioned are equally prevalent among the fruit-trees of Great Britain as amongst those of Russia, I must be allowed to plead ignorance.

No. I.—*Russian Receipt for preventing Mildew on Fruit-Trees.*

Take one quart of watky, (a Russian spirit prepared from the distillation of rye, and resembling in every respect the whisky of Scotland), two pounds of powdered sulphur, two ounces of copperas, and a small quantity of camphor. Dissolve first the camphor, reduced to powder, gradually in the spirit, then dissolve also the copperas in it; then rub in gradually the powdered sulphur into the

solution, when the whole will form a mixture of a thickish consistence.

The fruit-trees in the spring of the year, immediately after being cleaned and tied up, are to have their trunks and all their branches completely covered with this mixture, by means of a large painter's brush.

This receipt was originally communicated to Mr Cole by an old and experienced native Russian gardener, and he has continued using it, with the greatest success, ever since.

No. II.—*Receipt for preventing Gumming, or the spontaneous exudation of gum from the trunks of Fruit-Trees; which injures, to a considerable extent, the growth and strength of the Tree.*

Take of horse dung any quantity, mix it well up with a quantity of clay and a little sand, so as to make a composition; then add a quantity of pitch tar, (what is put upon cart-wheels), and form a wettish composition of the whole.

The fruit-trees in the spring of the year, after they are cleaned and tied up, are to have their trunks and stems completely bedaubed or covered with this mixture; when it dries, it forms a firm paste or cover around them, and is to be allowed to remain for months, till it fall off spontaneously. The apricot tree, in Russia, suffers most materially from gumming. Mr Cole discovered this receipt accidentally himself, from seeing the Russians

using it, and he has made use of it ever since with the greatest success.

In the northern parts of the Russian empire, as in the neighbourhood of St Petersburgh, and of course it becomes more striking as you approach the North Pole, on account of the severity and duration of the winter, no fruit-trees, with the exception of the hardiest species of apple, will produce or bring their fruit to maturity in the open air; consequently they must all, in that part of the world, the cherry tree included, be reared under glass. What may appear surprising, although strictly true, is, that there is scarcely any plant or flowering shrub which can resist the intense frost and cold of the winter in this climate, to be found out of doors; and at times even the hardy whin-bush is destroyed. Mr Cole shewed me lilac trees, alburnums, different varieties of thorn, whin-bushes, &c. growing in large wooden tubs filled with earth, and which were preserved there all winter, with the intention of being sunk in the borders of the garden as soon as the weather should grow warm enough to admit of it. Fruit-trees and shrubs, therefore, reared under these circumstances, may perhaps be more liable to mildew, gumming, or other diseases, than those of the milder climate of Great Britain.

In the gardens, and surrounding the villas and country-houses, palaces, &c. of the higher class of

Russians, and foreigners settled in the country, in the short period of a week from the disappearance of the winter, and commencement of the warm season, a beautiful and rich display of shrubs, flowers, &c. in full blow, consisting of hydrangea, various species of geranium and myrtle, wall-flower, carnation, &c. become visible. All these, however, are reared in hot-houses, at a very cheap rate in this country, during the winter, assisted by artificial heat; and as soon as the weather out of doors will permit, they are brought out in their pots, sunk in the earth along the borders of the garden, or placed upon the stairs, galleries, &c. surrounding the house. As soon as they have thrown their flowers, fresh ones are brought from the conservatory to replace them, thus keeping up an artificial garden, as it may be called, during the whole warm season; and when the cold weather begins again to set in, towards the end of the year, the whole are removed from the stairs, galleries, &c. of the house, and replaced in the green-house, where they are artificially fostered and protected till the genial warm weather of the ensuing season makes its appearance.

The Russians of all ranks are remarkably fond of flowers, after the long and dreary winter of their northern climate, and even the poorest house is filled with them. The streets of St Petersburgh, Moscow, and other large towns throughout the empire, at the commencement of the summer,

are crowded with people carrying all the varieties of them, in full blow, for sale, reared in the public green-houses, and they find no difficulty in procuring buyers at exorbitant prices. The hydrangea, from its shewy appearance, the great durability of its flower, and variety of colour which it presents, is a great favourite amongst them. By watering it with a solution of alum, they greatly increase the splendour, beauty, and the variety of colour, of its flower. The different varieties of cherry-balsam appear also to be great favourites of the lower classes, as they are to be met with in the windows of almost every village isba.

In the northern parts of the Russian empire, the cherry-tree, when not reared under glass, which is most commonly the case, is protected in an uncommon way from the severity of the winter. A long wide and deep trench or ditch is dug in the earth; the one which I saw, and now attempt to describe, contained a quantity of water at the bottom of it, but as it was during the month of May, it might arise from the melting of the snow, which still remained upon the surface of the ground; from each side of this trench or ditch a light frame-work of wood was fixed into the earth, and extended towards the centre, meeting its fellow from the opposite side, and in that way completely covering the ditch. The trunks of the cherry trees, which were young, were placed at re-

gular intervals from each other, and projected from the earth at the bottom of the frame-work, bending at obtuse angles, were tied down along with their branches, as they spread themselves out to the inner surface of the wooden spokes composing the frame, and assumed regularly the direction of it as their growth increased, so that the tops of the trees, from each side, met each other above the centre of the ditch. Previously to the setting in of the winter, when the leaves, falling from the trees, have left the branches completely bare, wooden boards, fitted to the frame-work which covers the trees, are laid above it; above that again a layer of dry straw may be placed ; and when the snow falls at the beginning of the winter, the whole becomes completely covered with it for several feet in depth, and no intensity of frost afterwards is sufficient to injure the trees thus protected, during the severity of the weather. As soon as the ensuing spring, or the warm season, has fairly commenced, the boards are removed, and the trees allowed to send out their leaves and blossoms, and to bring their fruit to maturity, without interruption. For the first month, however, the boards are laid lightly down during the night, until the frost has completely disappeared. These are called cherry-beds ; and the trees growing, producing flowers, and bringing an abundant crop of fruit to maturity, in such

an unnatural position, presents a most strange and unusual appearance: They brought to my recollection at the time, the idea of a human being made fast to a board, with the arms and legs extended, in the supine state, instead of the erect and natural position.

On account also of the lateness of the season, and the short duration of the warm weather, in the northern parts of the Russian empire, almost every description of seeds are brought forward by steeping in water for some time before they are put into the ground; and different species of young plants are reared to a considerable length first, in hot-houses.

Although the cherry tree, when reared in the northern parts of the Russian empire, must be protected, in the manner now described, against the severity and duration of the winter; and of course, from the expence attending it, can only be cultivated as an article of luxury by the richer classes of people; still, in the southern parts of it, where the climate is mild and genial, it grows in the open air, in the greatest abundance, with little or no attention paid to it, and even forms entire forests. In the government of Vladamir, the culture of this tree is carried to such an extent, that it constitutes a principal part of the subsistence of the inhabitants. The fruit, which are remarkably small, from the little attention bestowed

during cultivation, are used in making cherry wine, which is distributed through the country: An excellent aromatic vinegar is also obtained from them; and immense quanties of them are also dried in the sun for the winter's consumption, and, preserved in this state, they are to be found in all the grocers shops of St Petersburgh, Moscow, and other towns distributed throughout the empire, when they are consumed in various ways by the inhabitants. When eaten, they are rather acid to the taste.

Having now brought the subject of the present paper to a conclusion, I beg leave to call the particular attention of the Society to the consideration of the Cucumber, the Turnip, the Cabbage, and the Water-melon, with the various preparations obtained from them by the native Russians, as minutely detailed in the preceding pages. I am firmly of opinion, that the methods of applying the three former vegetables, which are cultivated in abundance in this country, to the various purposes of life, as now mentioned, may be introduced with great advantage into Great Britain, and prove a considerable and useful addition to our winter stock of food. With regard to the latter, the arbouse or water-melon, I would also take the liberty of recommending further attention to its cultivation. If the statements thrown out in these

pages, which I have derived from the most unexceptionable authority, and from practical and experienced gardeners, turn out to be correct, there is every reason to hope that its cultivation will succeed in this country; and if it do so, it will form a considerable and enviable addition to our other foreign fruits. If any of the above remarks be put in practice, and found to succeed; or if I have benefited my country, even in the slightest degree; I shall feel myself amply repaid for the time and trouble by which they have been acquired.

W. H.

III.

On the Management of Fruit-Trees on the Walls of the Garden at St Anne's, near Leeds, and particularly on the Retardation of Blossom.

By John Carr, Esq. of St Anne's.

(*Read* 10*th December* 1817.)

It is well known, that one of the chief causes of occasional failure in the crops of fruit from trees on walls, arises from the premature expansion of the blossom before the weather be sufficiently warm to allow the setting of the fruit. In the beginning of spring, it is no uncommon occurrence that an early warmth has covered a fruit-tree with blossoms, when a sudden return of cold, or even a single frosty night, blasts all its promise.

It is desirable, therefore, to adopt a plan which shall have for its object the exposing to the action of the cold the branches of peaches, nectarines, and other tender wall fruit-trees, so as to *retard* the expansion of the blossom until it shall appear probable that they can receive no injury from such frosts as may occur.

The practice of exposing vines to the cold of the winter, and, as the spring approaches, bringing them to a more elevated temperature, is well known to produce most beneficial effects in accelerating the growth, and also giving health and vigour to the plant. A treatment somewhat similar appears equally suited to trees on open walls; and a plan of this kind having been acted on at St Anne's for the last eight years, has proved, by regular and abundant crops of fine peaches and nectarines, that it is entitled to some consideration.

Instead of using common nails and shreds of cloth, nails with open heads, from one inch and a quarter to one and a half in length, and somewhat of this form , are substituted. These, when once driven into the wall, remain permanently there. Through the heads of these nails, strings or strands of matting are introduced, to support the branches, and keep them in their proper situation. At the fall of the leaf, all the strings are loosened, except a few that are necessary to keep the branches from being torn from the wall by high winds; and at the same time a wedge or block of wood is inserted between the wall and the main stem of the tree. By this management the principal part of the tree is thrown forward, and thus receives less shelter, and little or no warmth from the rays of the sun reflected from the wall, until

the branches are again fastened to the wall in the spring. This should never be attempted so long as there remains any probability of a return of very frosty weather. It is presumed also that the wood, by the freer exposure, becomes well ripened and hardened ; the tree acquires greater strength and vigour, and is enabled to bear large crops of fruit, while the time of blossoming is kept back at least a fortnight, which gives greater chance of the fruit setting. No covering nor nets are therefore required to protect the blossoms. It may be added that the tree, when loosened from the wall, is much more easily pruned ; and two very important advantages of this mode still remain to be noticed. The usual method of fastening branches by shreds and common nails, gives great harbour to insects in winter, and when the nails are drawn out for the purpose of pruning the trees, the operation defaces the wall, loosens the lime from the bricks, and in time nearly destroys the wall itself. In this way, both these inconveniences are effectually avoided.

It has never been found that the fruit resulting from blossom retarded by this mode of management is less early or perfect than that produced in the ordinary way. On the contrary, the bringing the branches to the wall after their more free exposure to the cold, appears to enable the tree to exert greater energies; the fruit equally soon ripens, and in point of size and flavour it seems to be su-

perior, to that of trees unretarded, or the blossom of which has been protected by coverings.

When the walls are flued, to assist in ripening the young wood after the trees are fastened to the wall, a little fire heat is used in October and also in April, and even in May, should the weather prove frosty.

The pruning of the trees is accomplished chiefly in March and April; at that period they are loose from the wall, and the wounds made by the pruning-knife heal sooner at that season than in winter.

It may be proper to observe, that in the arranging of the branches of the trees, each branch is laid horizontally, and not, as is often the case, at different angles from the main stem, which is itself always upright. By the horizontal mode of training, it is thought that the productiveness of the tree is much advanced, as all the branches thus bear fruit; and as soon as any of them become too woody and strong, they are taken out to make room for new branches, supplied by the younger shoots. The beauty and symmetry of the tree are also increased by this regular distribution of its branches.

The nails used in the plan which has now been described, may either be made of cast iron or stamped out of sheet iron. The former may cost from 5s. to 6s. per thousand, but can be used only in soft walls; the latter, which are in general preferable, may cost from 10s. 6d. to 12s. per thousand.

If they be intended, however, to be used in stone walls, they should be of a larger size than those employed in brick walls, or here represented *.

When the trees are troubled with insects, fumigation is resorted to. Previous to this operation a large piece of canvas which has been saturated with oil, and almost become oil-cloth, but is more flexible, is suspended by hooks to the top of the wall, and held close to prevent the escape of the smoke. Its size may be about $4\frac{1}{2}$ yards broad and $5\frac{1}{2}$ long. This oiled canvas suits also for covering dwarf fruit-trees during fumigation; and this forms a very expeditious method of clearing them from insects.

It is in the recollection of all who have gardens, that the last year (1816) was particularly unfavourable for ripening fruit on walls; and I may remark that in the present year (1817), very little is to be met with in this part of Yorkshire, or even in the south of England. At St Anne's, however, where this system has been acted on for several years, the year 1816 produced good and ripe fruit, and this year the peach trees produced, on an average, 65 fine ripe peaches each; the nectarine trees not fewer than 70; and the apricot trees, fruit in the greatest abundance.

St Anne's,
December 1817.

* The nails recommended by Mr Carr, may be had at the shop of Messrs Dickson & Co. Regent Bridge, Edinburgh.

Extract of a Journal kept by Mr Carr at St Anne's, as illustrative of the foregoing Communication.

1817.

March 18, 19. Observing the blossom appearing partially, began pruning and fastening the peaches and nectarines to the wall; but a severe frost happening on the 19th, we did not proceed.

—— 20, 21, 22. Very severe frosts, which would probably have destroyed the blossom, but the trees not being fastened to the wall, it was not expanded.

April 3. 5. Finished fastening the trees to the wall; and this last day the peach and nectarine blossom fairly out.

—— 18. to 26. Frost for eight or ten nights; consequently had fires at the flued walls. The trees on the other walls, consisting of pears, &c. appeared to suffer severely.

—— 28. to May 2. The fruit on the peaches, nectarines, &c. are by this time set, and in

September and October had a very fine crop of fruit, which fully ripened.

1818.

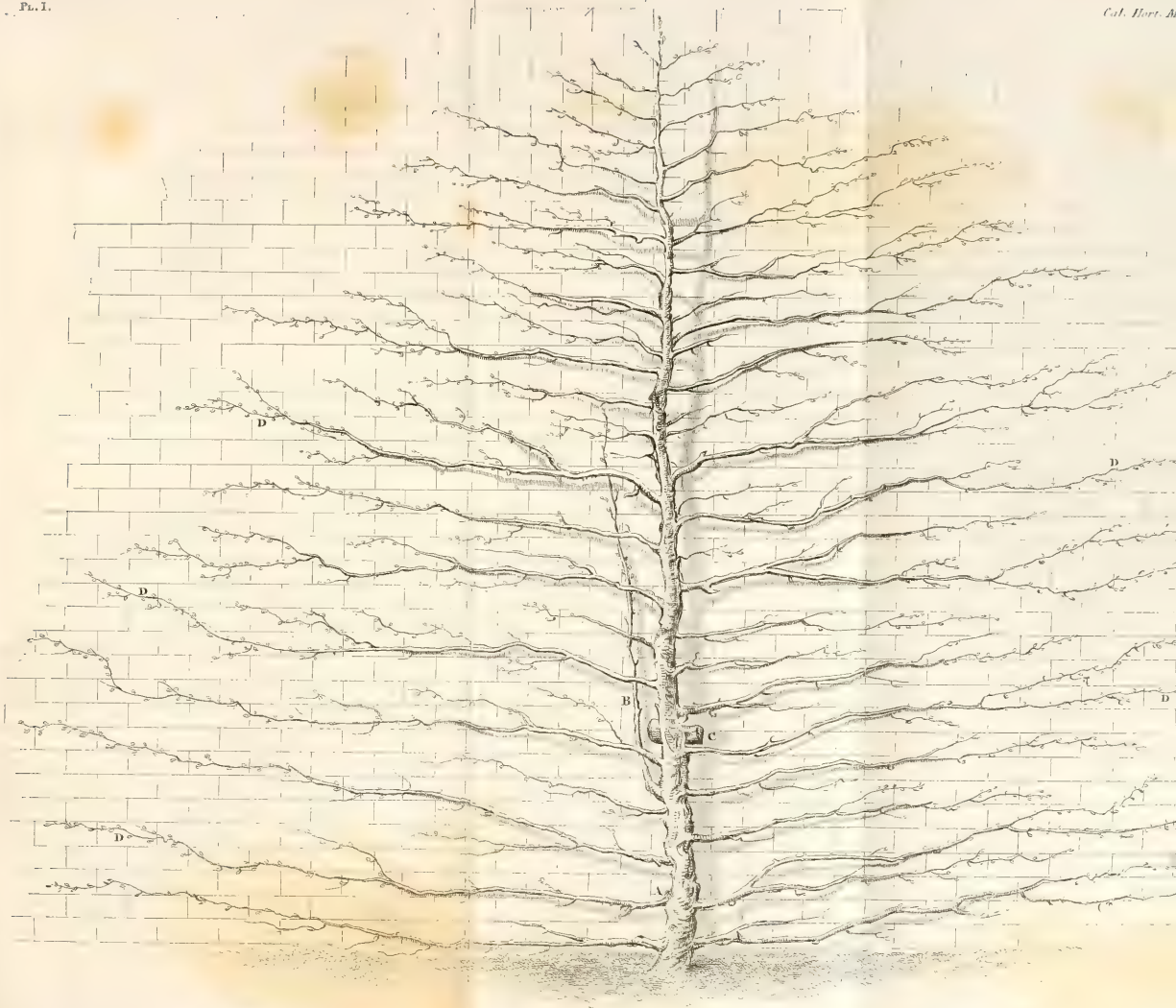
April 18. The peaches and nectarines have been kept so much back, by being loosened from the wall, that they are only now begun to show

blossom; and by being thus retarded, I have no doubt that by using fire in the flues on the frosty nights that may yet occur, they will escape all danger.

December 10. This season has been a remarkably productive one at St Anne's in peaches and nectarines, each of our trees yielding from 120 to 160 fine ripe fruit.

Explanation of the Plate.

The plate represents a tree at St Anne's, which about six years ago was either struck by lightening, or met with some accident which rendered it necessary to cut it down to the point marked by the letter A, since which time small branches are occasionally trained up by the side of the main stem, to replace it in case of accident, as at B. C shews the wedge put behind the main stem in winter, which throws it forward, and is not taken away till the tree is pruned and fastened to the wall in spring. D shews the points where the branches are tied to the nails, to prevent their being blown about or injured by high winds. It will be observed by the shade that the tree is loose, and kept a little forward from the wall.



Engd. by W. & D. Lizars Edinr.

IV.

On the Application of Steam to the Heating of Forcing-Houses, and other Kinds of Hot-Houses and Frames.

By Mr John Hay, Planner, Edinburgh.

(Read 2d March 1820.*)*

The application of steam to forcing-houses early caught my attention. The first that I designed and executed in Scotland on this plan, were at Prestonhall in Mid-Lothian, in the year 1794. The fruiting pine-stove, which is in the general suite of houses, with two peach-houses on the west, were originally adapted to steam. I entertained the hope, that steam thrown into a chamber, in the bottom of the plant-pit, would act as a proper substitute for bottom-heat in place of tan, as none of that substance was to be found nearer than four miles distant, and when wanted was often difficult to be procured. Other more general considerations also made me desirous of procuring some substitute, particularly the necessity of repeatedly shifting the plants to renew the heat, when the bark

in the plant-pit gets cold: these shiftings, besides the trouble, often retard the growth of the plants. Again, if the heat of the fermentation of the tan rise much above 96 degrees, (which it often does), and if the pots be fully plunged in the tan at such a time, many instances have been known of the roots of the plants being burned, and some of them being destroyed altogether. This, indeed, may be considered as one of the principal reasons why so many are unsuccessful in the culture of this fine fruit. With the view of obviating the above difficulties, the bottom of the fruiting pine-pit was constructed with a chamber below, into which steam was introduced by means of copper and lead pipes from a boiler placed in the shades behind: the top of the chamber was constructed of rafters, on which were placed broad grey slates, laid on loose, without filling up the vacancies between them. The not making them close, I afterwards found to be an error; for the moisture, from the condensation of the steam, penetrating through the openings at the joining of the slates, communicated too much wetness to the bottom of the pots; but I found, that there was a sufficient quantity of heat to be obtained from the steam for heating the plant-pit, provided the bottom were close. I therefore discontinued this plan; and I had not an opportunity of making any farther experiment on the subject in this place. From the same boiler, I conducted into the two peach-houses adjoining, a range of

pipes furnished with steam-cocks. They passed the whole length of the houses, (101 f. 6 in). By means of these, the peach-houses were regularly steamed near one hour a-day in the evening, in the time of flowering and of fruit-setting. Steaming, it may be remarked, is very important at these times. In after periods, when I had not an apparatus for the purpose, I always steamed the peach-house with a large piece of cast-iron, made red hot in one of the furnaces, and put into a white-iron pail nearly full of water; the whole water thus evaporating into steam. I was always successful, while in practice as a gardener, in raising a full crop of peaches; and think that much was owing to attention to steaming.

I afterwards erected pine-stoves for John Hervey, Esq. of Castlesemple, to be heated by steam; and one of the plant-pits had a chamber below, with a close bottom, into which chamber steam was thrown, by means of cast-iron pipes. About the same time, I was applied to by Sir Hew Hamilton Dalrymple, Bart. (through Mr James Dodds, his gardener), to examine his pine-stoves at Bargany, and to report whether I thought they could be improved, as he hitherto had not been so successful in pine-apples as he expected. One principal cause was, the difficulty of obtaining tan. Upon my report, it was to be determined, whether to give up the pine-apple culture altogether, or endeavour to improve the stoves.

Upon examining, I advised the heating of the atmosphere of the houses with steam; and in place of using tan, the heating of the bottom of the plant-pit with steam also. This advice was adopted, and the plan was executed in the following manner.

The stoves are in two divisions. In the shade behind them a cast-iron boiler is erected, (containing 11 square feet of surface of water), and so placed, that two pipes from the top of the boiler are taken into one of the divisions. Two pipes from the same boiler are also intended to be taken into the other division. The one pipe is calculated to heat the atmospheric air of the house, the other pipe to communicate heat to the bottom of the plants. Water is supplied to the boiler by its being connected to a small leaden cistern, (with a hinged cover), by a pipe near the bottom of the boiler; the cistern again is supplied by a cock and ball, the ball of some size and weight, so that it may easily open the cock when the water falls below the level in the boiler, and as easily shut it again when the water resumes its level in the cistern and boiler. On the top of the boiler, each pipe is furnished with a steam-valve 8 inches in diameter: such valves are, I think, better than cocks, and much less expensive. The steam is turned into any of the pipes at pleasure, by drawing up the valve of the pipe into which the steam is wished, and putting down the rest of the valves; or the two pipes that

belong to the right hand-division of the stoves may be both open, and the left hand-division of pipes may be shut; or the valves of the pipes that communicate with the bottom of both the pits may be open, and the valves of the pipes for heating the atmosphere of the house may be shut, as the experience and judgment of the gardener may direct. The boiler has a cock at its bottom, to draw off the water when it becomes necessary to clean it, and a cock may also be attached to the boiler at the level of the water. The strength of fire is regulated at pleasure by dampers, one in the upright chimney and another in the door of the ash-pit.

The bottom of the pine-pit is constructed of cast iron rafters, on which are laid fire-clay bricks, $2\frac{1}{2}$ inches thick, 18 long, and 9 inches broad, half checked, and laid so close as to prevent any escape of steam through the joinings. The chamber below is 2 feet deep, and paved with common bricks; in the middle of this chamber, a round cast-iron pipe of $3\frac{1}{2}$ inches bore, runs the whole length of the pit, supported with brick-pillars at different places, to raise it 6 inches above the floor of the chamber. The pipe is close at the further end, with a small pipe on the under side, to carry off the water arising from the condensed steam, into a small sess-pool, and from this a small drain to carry of the water as it overflows. In the middle of both sides of the chamber pipe, are small holes

bored, in quincunx order, but smallest at the end next the boiler, so that the steam may fill the chamber equally. This pipe is connected with the pipe entering the stove from the boiler, and passes forward until opposite the middle of the chamber.

In the front of the stove is a square steam-pipe or flue of 6 inches on the side, and neatly joined together: this has a better appearance in the house than a round pipe. On the upper side of this pipe, at proper distances, there are steam cocks and brass valves screwed into them. The valves serve to prevent any accident to the boiler and pipes from vacuum, when the steam is let off. The cocks are for the purpose of admitting steam into the stove or turning it off at pleasure. When the steam is admitted into the stove, it will instantaneously raise the heat of the air a considerable number of degrees higher than it was before, and will maintain this increased temperature as long as it is continued, which may be for a short time at once, and the oftener repeated, as the observing and judicious gardener may see fit. The steam being necessarily of a moist nature, tends much to the growth of the plants, damping them in a few minutes with warm dew. It also tends to prevent the breeding of insects, and to assist in destroying those already on plants; nor have I ever observed any bad effect from this warm moisture, even in the peach-house, and when the trees were in flower, although I

have raised the heat of the house very high by it, at that period. The plant pit, which is 2 feet deep at the back, and 1 feet 6 inches at the front, is filled with coal-ashes from the furnaces, on the top of which is laid as much decayed tan as will plunge the pots.

The above is explained according to the design given, not as it presently stands, as the plant-pit in the succession division of the stove has not yet been altered, and adapted for giving bottom heat by steam, although the atmosphere of the house is heated by steam as described above; but the boiler is constructed with the view of that being done.

The design does not stop here, although not yet executed: the melon ground at Bargany forms an oblong square, enclosed with a brick wall on the north, east and west, and on the south by a low wall and hedge.

The pine-stoves are placed on the south of the north wall: in the front of the stoves are a range of three low pits with flues, for different purposes, such as nursing young pine-plants, and forcing roses, and other flowers.

In the front of these are a range of large melon pits; and in front of these again, another range, of narrower dimensions.

From the same boiler that supplies the pine-stoves, a pipe passes through the stoves into the centre pit in the front of them, with a view to supply it with bottom heat. The atmospheric air of

the pit may also be heated by the steam, by turning two cocks or valves. The steam is thrown from this pit, and passes forward into the centre division of the large melon-pit, (which is designed for the large growing kinds); and by turning other two cocks or valves, the steam is thrown off this pit, and passes forward to supply the middle division of the narrow ones, (which is intended for the smaller kind of melons and cucumbers); and by the pipes being extended in branches to right and left, they may easily supply the whole bottom with steam-heat in place of dung or tan heat.

After the above alterations were completed in the pine-stoves, and knowing that Mr Dodds, from his experience, was able to give the whole a complete and patient trial, I requested that he would communicate his observations to me; and the following is his report, after eighteen months experience.

" *Bargany, 26th February* 1820.

" Dear Sir,

" After finishing the improvements you designed on the pine-stoves here from fire-flues to steam pipes or flues, and to obtain bottom heat from steam, in place of tan; you requested of me, after a complete trial, to give you my observations on the result, which I have now the pleasure of doing.

" It is now eighteen months since I first began to heat the pine-stoves here with steam. I have

thus been enabled to give it a fair trial, and I am fully satisfied that it is superior to the old method of heating by fire-flues. I have found the plants to grow more luxuriantly, and perfectly clean of any kind of *insects*. The moist heat arising from steam is well known to be hostile to all kinds of vermin. It is besides more economical : our pine-stoves here are 70 feet long, it formerly took two fires to keep up the heat of the atmospheric air of the house, whereas in the new method of heating by steam, one fire to heat the boiler is sufficient, except in very cold nights, when I have found it necessary to light a very small fire to the flue, to meet the decline of the steam in the morning, and this only to the fruiting-house in the spring months, when the pines begin to shew their fruit. In short, I have found no difficulty in keeping up the heat of the house to 60 degrees, by making up the fire to the boiler at ten o'clock at night, and at six o'clock in the morning.

" With regard to the bottom heat for the pine plants, by steam from the same boiler, I find, by allowing the steam to remain in the chamber below the plants about two hours a day, the pit is kept constantly at the temperature of from 90 to 95 degrees, which I have found to be as high as the roots of the plants are able to bear. I would, therefore, say 90 degrees to be the standard height, which I have myself adopted, allowing it to fluctuate down. If our succession pine-pit had been

altered to have been heated by steam, as the fruiting one is, which the boiler is perfectly able to do, the saving in tan alone would more than pay the interest of all the money laid out on erecting the whole steam apparatus.

"The above is my candid opinion on the subject, as far as my practice has enabled me to speak. I am, &c.

(Signed) "JAMES DODDS."

From the account now given it will appear, that bottom heat from steam as a substitute for tan-heat, was the grand object that I contemplated.

Mr Dodds states in his report, that by allowing the steam to remain about two hours a-day in the chamber below the plants, he finds that the temperature of the plant-pit is constantly kept at from 90° to 95° Fahr. I may remark, that this degree of heat being kept up from steam, it cannot rise much higher, and never so high as to burn the roots of the plants, while it may readily be regulated to any number of degrees less heat.

The following observations are submitted to the intelligent and practical gardener, and may be worth the attention of those who have opportunities of making experiments with steam-heat.

1. May not pine-apple plants in pits of the above description, be grown in the earth without pots? For instance, if there were a small nursing-

pit and two steam-pits, the offsets and crowns of the pines might be struck and kept in small pots, until say the 1st March 1820, when they might be planted into one of the steam-pits in a bed of proper compost prepared for them. They would in the ensuing summer, grow strong plants, as they would receive no check from shifting, &c. as in the common way, and would give fruit in summer 1821. The other steam-pit, to be planted the 1st of March 1821, would give fruit in 1822, and so on in succession. In this case, the suckers might remain longer on the stools than in the common way, and if they continue to grow freely, might remain in this state until spring, by which time they would be fine and large. Or, if the bed in the plant-pit be made up with proper compost and brought to a proper degree of heat from the application of the steam in the chamber below, the strong suckers, after taking them from the stools, might be planted at proper distances, and continued in their place until fruited off. If this could be accomplished, it would save much trouble to the gardener, and expence to the proprietor, while at the same time the culture of them would be rendered much easier and more general.

2. May not steam-heat also be applied to the growth of melons in pits of the above description, in place of dung-heat? In many cases dung or litter is difficult to be procured for this purpose; a great deal of trouble and time would be saved

to the gardener, and the disagreeable figure that this department of the kitchen garden often presents with nastiness and litter, would be prevented.

3. Might not a conservatory be constructed upon the principles of the above pine-stoves for tropical plants, to be planted in the earth or border, as plants in common conservatories are, in which they would grow and flourish with some degree of their natural size and grandeur? The bottom of the plant-pit of such a conservatory may very properly be constructed of square pavement, such as that to be found in the neighbourhood of Dundee, which is of a hard and strong nature, and can be got of any length, breadth and thickness required. These might rest on nine inch square brick pillars; and should the plant-pit be of large dimensions, the heat might be increased in proportion to its size, by having two or even three turns of pipes, and letting the steam escape from the last turn, in the manner above described. Drains from the bottom of this pit would be necessary, and might be made by building them of brick, or by pieces of lead-pipes from the top of the pavement, (which ought to have a small inclination to the south), through the steam chamber into its bottom, so as to prevent the steam and heat to have any communication with the drain.

4. Might not a hot-house or stove also be constructed with bottom heat from steam communi-

cated to a bed of earth, in which tropical fruit-bearing trees might be cultivated in the earth without being confined in pots ?

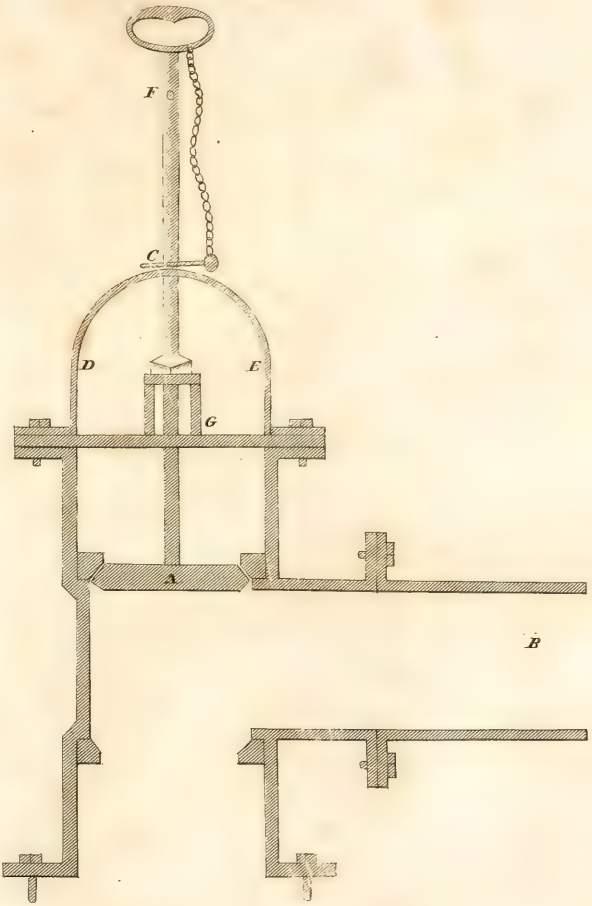
I have just finished a plan for a nobleman with an improvement somewhat of this kind, in which the pine-pit is heated as above described, with a bed of earth between the back-wall of the house and the back-wall of the plant-pit, with a chamber below for steam. The back-wall of the stove will then be planted with such kinds of tropical fruit-trees as may be preferred. Oranges, shadocks and citrons on the back-wall would make a fine contrast in the same house, with pine-apples in the pit, and a small quantity of grapes on the rafters. But the Mespilus Japonica or loquat might be introduced; for that tree produces its fruit in some stoves in England.

I am happy to observe, that the use of steam for the heating of hot-houses in general, has of late years been much attended to in the neighbourhood of London, particularly by Messrs Loddiges and Sons of Hackney, whose extensive establishment I had an opportunity of visiting two years ago.

An illustration of the beneficial effects of steam on the native plants of this country, may here be mentioned. When at Kilkerran in Ayrshire, about seven years ago, I observed, at times, a column of vapour resembling light-coloured smoke, rising out of the midst of a large fir plantation on

that property, and was informed that it proceeded from a coal-mine on fire, and which had been burning for 60 or 70 years past. I repeatedly visited the spot, and found that the vapour was chiefly steam, having a very considerable degree of heat, and a disagreeable smell. It issued from one large aperture, and from a considerable number of smaller openings of different dimensions, in the top of the rock, which is sandstone, and has very little earth on the surface. The space over which the holes are scattered, from which the steam issues, being of a considerable extent, is covered with different kind of mosses and wild plants, the growth of which is most luxuriant and beautiful; so that these favoured plants form a singular contrast when compared with the same species in the immediate neighbourhood beyond the influence of the steam heat. I observed to the gardener, who accompanied me to the spot, that he had it in his power to make a variety of experiments by this steam heat, as it issued from the rock in so many different places, and in different quantities, and lay only at the distance of a mile from the garden; and pointed out the advantage that the native plants had derived from the influence of steam. But, in general, I have found gardeners backward to attend to the advantages to be derived from steam heat. The public are therefore indebted to the two Horticultural Societies of Lon-

Section of the Steam Valve.



To a Scale of ½ to an Inch.

don and Edinburgh, and to Messrs Loddiges already mentioned, for bringing it into due notice.

EDINBURGH,
10. *Catherine Street*,
26th February 1820.

Explanation of the Plate.

A shews the valve drawn up, admitting the steam into the pipe B. The valve is kept in this position, by a pin passing through a hole at C in the stalk of the valve, and resting on the top of the arch DE. When the steam is to be turned off from the pipe B into any other, the pin at C is taken out, the valve pressed down, and the pin put through the hole F, which then falls to be on the under side of the arch DE. This prevents the pressure of the steam from raising the valve. G is a small stuffing-box, to prevent any escape of steam.

V.

An account of the Russian Chiccory Plant, and of the Artificial Coffee, prepared in great quantity, over that country, from its root, as well as from the roots of common Dandelion.

By William Howison, M. D.

(Read 2d September 1819.*)*

The Russian chiccory-plant is the Cichorium Intybus or Succory of this country. From its being produced in a cultivated state, for the purpose to which it is applied throughout the Russian Empire, it becomes larger in its leaves, the whole plant increases in size, and the roots, the part employed for the above mentioned purpose, are larger, thicker, more plump and juicy, than in the native plants of England. The chiccory grows wild amongst the fields, and pastures of the Russian Empire, in great abundance, in the same manner as it does in Kent; but on account of its wild dwarfish nature, is not equal in any property whatsoever to the cultivated sort,

which is the one always employed, and reared in great quantity, to furnish the artificial coffee.

When the chiccory is cultivated, the seeds are sown early in the season, in large square well manured beds; and the plants are brought forward much in the same manner as lettuce or endive in Great Britain. When the plants, in the course of a few months, have reached their full maturity, they are taken from the ground in their perfect and entire state; the leaves and stalks are cut away, their long fleshy, carroty looking roots are well washed, scraped, dried and cut into small pieces, from an inch to half an inch long, by means of knives for the purpose. As soon as a large quantity of the roots thus cut into pieces, has been collected together, they are placed upon the stoves or peatches, where they are gradually heated, being turned round at regular intervals to prevent them from burning, until they become completely dry; or they are dried by exposure to the intensity of the sun's rays. In this state, when properly prepared, they ought to be brittle, firm, light, flinty, and of a white colour, with a sweetish bitter taste, as those contained in the specimen, marked No. 1. now presented to the Society, (which were made by Mrs Booker, at Cronstadt, two years ago), as when they are brown and of course burned, the coffee prepared from them will prove inferior. The root thus prepared, will preserve for any length of time, and is

sold in this state, throughout the principal towns of the Russian Empire.

In this state, the pieces of the root may be compared to the unburnt coffee bean of the West Indies, as imported into this country; and the same processes become necessary to fit them for use. Like the coffee bean, they must now be roasted in any quantity, or by any peculiar apparatus, until they become lighter, and of a rich brown colour, which the Russians do, in their peatches, gradually increasing the intensity of the heat. The last process which they must undergo, is that of reduction to powder, by means of mills for that purpose, or any other method, when a coffee is formed, such as that contained in the specimen No. 2. presented to the Society, which was also made by Mrs Booker, at Cronstadt, two years ago, of a rich brown colour, forming a fine minute powder, possessed of a flavour, when recently made; and in many respects resembling the coffee made from the coffee-bean of the West Indies.

In the neighbourhood of the town of Viborg, about 150 versts from Petersburg, there is a very extensive manufactory of coffee from the chiccory plant. About 50 acres of ground are there annually manured and planted with it, early in the season. When they have reached maturity, the plants are taken up, their roots collected, washed, scraped, cut into pieces, and dried upon extensive stoves or peatches, with which they are

furnished for the above purpose; all this labour is performed by women, above 100 of whom are employed in it. At this place there is an extensive apparatus for burning, as also mills for reducing it to powder. A great quantity of it is sold over the Empire, in the state in which it is after the first drying; and a much greater quantity in the state of powder.

The chiccory coffee thus prepared, is consumed in great quantity over the whole of the Russian Empire, by the various classes of people. The powdered coffee can be procured to purchase in almost every grocer's shop in Petersburg, Moscow, and the various towns throughout the interior. It sells at about 50 copeeks, or, by the present rate of exchange betwixt the two countries, nearly sixpence English money *per* lb. The root, after the first drying, can also be procured in any quantity. The greater number of private families, who have gardens or fields, grow and prepare it for their own consumption. Almost all the British families settled in Russia, mix it with the West India coffee, in the proportion of one-third, and are convinced, from experience, that they never drink good coffee without this addition. The Russian nobility, who make use of coffee to a considerable extent, consume a great quantity of this compound. In the interior of the country, the inferior class of people, who can procure no West India coffee, make use of the artificial sort entirely

by itself as a substitute; and I have been told by those who have drank it, that it forms a very pleasant beverage in that state. Mrs Booker, who daily uses this article, tells me, that, after frequent trials, she is convinced, that the best proportions to use it, are one tea-cup full of the artificial to two of the West India coffee, mixed together, which she always does; and I feel no hesitation in saying, that in no other family have I drank coffee, superior to what I have done in hers. The chiccory coffee ought to be kept separately in a canister and not mixed with the West India sort, until just going to be used.

The chiccory plant might be cultivated in any quantity, and at little expence, in the humble garden of the peasant, or in waste ground; and the coffee can be procured from it with little additional outlay. It is a most excellent substitute for coffee, when drank by itself; and a very great addition, and improvement, when mixed in the proportion stated above, with the West India sort. It might be obtained by all classes of the community; by the poor, at little expence, and of course with considerable saving of money by the rich. In addition to the roots, the only part of the plant made use of to furnish the coffee, the leaves and stalks will afford food for cattle; or even may be used, as is done in various places of the Continent at the commencement of the season, as a sallad. All these circumstances taken into considera-

tion, it appears to me, that attention to its cultivation might merit the notice of the Society. Additional information upon this subject may be procured from members who have lately visited the Continent, as I am well aware that this plant is extensively used in Germany, Holland, &c. to furnish coffee, and was particularly so during the late war.

I have only seen the chiccory plant in the northern parts of Russia, towards the termination of the winter, where the young plants were reared in boxes in the house, in order to transplant into the open air during the spring. In the above state, from want of light, or exposure to the air, they were weak and blanched, so that it was scarcely possible to distinguish what they were.

I have now, however, to add, that not only is the succory root used as a substitute for coffee, but that the lower orders employ the root of common dandelion for that purpose. In remote parts of the country, I saw quantities of dandelion roots dried for this purpose. Sir James Wylie in his *Pharmacopœia Castrensis Ruthenica*, p. 163, Art. Leontodon Taraxacum, notices the fact : " Radix ustulata in vicem coffeæ, per modum infusi, ab egenis sumitur."

I shall bring this short notice regarding artificial coffees, to a conclusion, by mentioning the following anecdote communicated to me in favour of the use of dandelion root, by Mrs H. a Scotch

Lady, for these number of years past settled at Petersburg. Whilst upon a visit to Scotland, some time ago, she took up her summer residence at Lasswade in the neighbourhood of Edinburgh. Here no chiccory was to be found, but she observed Dandelion growing in great plenty, and applied to no particular use. Not having drank good coffee since her arrival in Scotland, she resolved to make from the roots of dandelion an imitation of the chiccory coffee, she had been accustomed to use in Russia, and mix it along with the West India sort. She ordered a quantity of the dandelion to be dug up, and the roots to be washed, scraped, and cut into pieces. She then exposed them, spread out upon table-cloths, to the sun, during the heat of the weather, and regularly turned them for several days. When they were sufficiently dried, she roasted them after the manner of coffee beans, and then ground them to powder in a coffee-mill. This powder she mixed in the proportion already mentioned with the West India coffee. After which, she said she always enjoyed excellent coffee, equal to what she had been accustomed to drink upon the Continent. The only difference which she remarked was, that the roots of the dandelion were small and shrivelled. She attempted also to dry them by the fire, in place of sunshine, with which, in this part of the world, we are so sparingly supplied; but from not possessing the means of doing it, in a regular, steady manner, the drying went on

with too much rapidity, and the plant became entirely shrivelled. Were the dandelion cultivated, there can be little doubt that roots of larger size, and greater plumpness, would be procured.

I have only to add, that since my return to this country, I have made a coffee from the dandelion roots answering nearly to that of the Russian, and therefore, form the conclusion, that dandelion cultivated, might answer equally well as the real succory plant.

VI.

On the Advantages of the Shallow Planting of Fruit-Trees.

By Mr Edward Sang, Kirkcaldy.

(Read 1st June 1820).

The question, What is a bud? is of some importance. It is sometimes called an eye. It may likewise be termed an egg or embryo of a future plant. In this respect, therefore, it is equal to a seed; but if a bud is the embryo of a future plant, then it must contain the rudiments of roots as well as branches. Can a bud in any circumstances become capable of producing leaves, flowers and fruit, without first producing its roots downwards, in order to obtain nourishment for them? It appears the instant a bud, separated from the wood on which it grew, is put under proper circumstances, that it protrudes its roots in quest of aliment for its future progeny. This may be exemplified in the raising plants from single eyes of the vine. But if this is correct, every bud upon a plant,

must, in its effort to grow, protrude or push downwards its roots in search of nourishment. It is not however essential for buds to do so the first year after being formed; but, like many seeds, they may remain, even in their proper soil, for a great number of years without vegetating. In what light does this place the solid part or timber of a tree? Is it not to be regarded as the groundwork or structure which nature has reared, whereon the buds may exhibit their peculiar properties for the use and comfort of men, and other animals?

Let us examine the process of nature in forming this mass of solid wood. The first year's shoot from the bud or seed is a small slender cone, envelloped in the bark, wherein is placed a number of buds, with a corresponding number of leaves, whereby the juices, collected and sent up by the roots from the earth, are concocted and formed into timber, new bark and buds. And when the leaves have performed the functions required by nature, in as perfect a manner as the season and circumstances will allow, they fall off from their places, and, rotting upon the surface of the earth, again restore part of that matter which they extracted from it. At the end of the first season, nature has left her work in the most perfect condition; every bud wrapped up in impenetrable coverings, almost like a tube hermetically sealed, till the mild season of spring, and genial

warmth, call forth into action the powers of the new progeny; these repeat the same exertions, with an increased power, in proportion to the increase of their numbers. Thus, every subsequent season produces a new cone of wood over the previous one, with increasing vigour, till nature has reared up a tree to perfection. A tree continues for many years afterwards, without signs either of improvement or decay. The first and subsequent cones of wood acquire a firmness which goes on increasing, till the whole mass is in the best possible state as timber. This of course is the period, at which it ought to be felled for use.

If the doctrine of buds above stated is true, we have an easy explanation of the theory of grafting or budding. Thus, a wild crab may be conceived as the proper soil wherein to sow or place any bud of the same species. Accordingly, if we cut off the top of the crab, and insert a graft, (which is an assemblage of buds), or a single bud, allowing *it only* to grow, the whole nature of the plant, *upwards* from the bud or graft, becomes of the same quality with the tree from which the bud or graft was taken. But no change whatever has taken place on the nature of the plant below the graft or bud, excepting in the case of disease having been inherent in the constitution of the bud or graft; in which case it sometimes sends downwards its corroding or deleterious qualities, and

thus renders the stock as unhealthy and infirm as the graft, or the tree from which it was taken.

A young, vigorous and healthy stock will not communicate renovation or health to a diseased bud; but the contrary will invariably be the case, a diseased bud will contaminate the healthy stock.

The case, however, is different with a diseased stock; for, if a stock, whose constitution is diseased, be cut over, and a graft or bud of a healthful and vigorous plant put upon it, the disease of the stock will quickly be communicated to the bud or upper parts of the tree, which will soon shew itself in decay and death.

Although disease may be propagated in this way, it is often induced by other causes; for, should a young tree, with both the stock and the graft, as healthy as possible, be planted under improper circumstances, disease and death will follow. I have even observed this happen in cases where the greatest degree of pains had been taken to prevent it. I wish to be well understood as to this circumstance, and shall therefore enlarge upon it.

There are two means of promoting vegetation, —the increased temperature of the soil, and the increased temperature of the atmosphere. When both of these coincide properly, vegetation is most rapid and perfect. This coincidence is sought for by gardeners, by means of fermenting masses, and placing frames with glass covers over them, as in

raising melons and cucumbers; and by these means, it is obtained to considerable perfection. The same attempt is made in what are called *Hot-borders*, having flues for the passage of heated air and smoke under the soil, and canvas covers raised over them; but the effect here is very imperfect, and the results are generally abortive.

In other cases the horticulturalist is satisfied with increasing the temperature of the air only, as in the early forcing of peaches and grapes under glass. The roots of these plants are found spread abroad many yards on the outside of the hot-houses, in which early forcing thus takes place. It is observable, however, that the progress of vegetation is extremely unfavourable, in severe frosts that have penetrated deep into the soil without; the frost having so much cooled the soil, and benumbed the roots, that the latter are incapable so to perform their functions as to send up the necessary supply of juices for the demand of the young shoots, leaves, flowers and fruit, in the favourable atmosphere within. It is from these causes, probably, that the rapid decay of early forced plants arises. Even although the gardener use the very necessary precaution of covering the border on the outside of the forcing-house, in which the roots of the plants are, to a good depth, with stable dung or litter, yet it is impossible for him to cover to the extremities of the roots, or to promote or obtain the due temperature

of soil necessary for coinciding with the atmosphere of the house. In the countries where the peach and the grape ripen to perfection in the open air, the power of the sun is so considerable, that the penetration of his rays sensibly increases the temperature of the soil in which the roots pasture, and causes such an equality between it and the temperature of the atmosphere, as produces perfect results. It is observed that the grounds in which grapes arrive at the greatest perfection, are not the *deepest* soils, but such as have a moderate depth, with sound and comfortable bottoms, of decayed rock, chalk or limestone.

I may notice in this general view, the necessity of coincidence of temperature of soil, and of climate, in the cultivation of the pine-apple. Every gardener knows that it is essential to its productions to keep up the temperature of the soil: And, indeed, that circumstance is the foundation of all his success. A certain degree of equality between the temperature of the soil and of the air, is therefore most important to the health of plants.

In the middle of winter the soil is very much cooled in this country; yet not nearly so much as the atmosphere, excepting to a limited depth. As soon as the sun has warmed the soil by his rays in the spring, so soon do plants begin to show signs of returning vegetation; and the nearer their roots are placed to the surface of the earth, (pro-

vided the subsoil be dry), the sooner are their powers put in motion. If the roots of a plant are buried several feet below the surface, it will be somewhat later in vegetating than otherwise; besides, it will not be so healthy, as if they were nearer to it.

I have said above, that I have seen many instances, where, by much pains to render trees healthful, the contrary effect had been produced: And I now go on to shew the cause.

In cold tilly soils, where the bottom is wet, if a border of considerable breadth be trenched, to the depth perhaps of two feet, or two feet and a-half, it is evident that the space so trenched, will now have a deeper soil than the adjoining grounds, unless draining be very completely performed all around on its higher sides, and the superabundant moisture carried off at its lowest extremity, it will also hold a greater proportion of *water* than the surrounding ground; this will unavoidably take place, from its being softened to a greater depth by the trenching. It may even be said, that no draining will render dry, or comfortable, for many kinds of fruit-bearing trees, a tilly cold bottom, at two and a-half feet depth; and even if it should, it remains yet to be shown whether such a depth is salubrious for fruit-bearing trees. If, however, the ground has been trenched so deep as above noticed, and without the precaution of draining; and if fruit-trees of ever so healthful a

constitution be planted in it, they always get sickly and cankered. This will often happen even where there does not appear any very considerable degree of damp. They will perhaps set off with great vigour for the first season or two; and they may continue for eight or ten years, apparently very healthful: but by and by they begin to droop; the extremities of the shoots die off, and the lateral shoots, though strong, will often by that time die quite down their whole length. Canker will begin to show itself on many parts of the plant; topical applications in such cases are of no use. The cause of the disease seems obvious. The roots of the plant get down to the bottom of the trenching. Those nearer the surface are first excited into motion, by the penetration of the heat; but those so far buried under it, are much later in receiving the benefit of the sun's rays. Of course they supply a quantity of juices to the plant at a later period of the season, which the leaves have not time to concoct; and perhaps before this sap has been in any considerable degree digested, frost comes on and deranges the whole operation. Thus a large quantity of crude, indigested matter, is fixed in the system, which is likely to break out in one form or another. Now, had the soil been kept at a less depth, even to the planting of the trees upon the surface, and raising the earth around and over their roots, what is stated above could not have happen-

ed. Because, in that case, the powers of the whole roots would have been excited at once, and the juices sent up by them, would have been early concocted, and firm, ripe wood, for the following season would have been produced, before the winter frosts could have set in. In short, I consider deep trenching, one of the great causes of disease and canker in fruit-trees.

But canker and disease often occur from soils of a nature entirely opposite to that now spoken of. In soils of a very porous nature, with dry bottoms, the trees set off with very great vigour in spring, being greatly aided by the portion of moisture retained in them for some months; but upon the first severe drought, every particle of moisture is exhausted. The multitude of buds, leaves and shoots, are prematurely deprived of that supply of aliment required to perfect them, and they languish. Many of the leaves drop off. The roots exert themselves, and stretch abroad in search of what cannot be found, until perchance, in the autumn months, a large supply of moisture arrives, of which the exhausted subject drinks too copiously, by which a superabundance of juices are introduced into the system, which are arrested by the early frosts, and consequences as fatal to the fruit grower follow, as in the former case. Indeed, towards the successful culture of fruit-trees, much more depends upon the nature of the subsoil, and

the depth of soil over it, than many people imagine.

In making gardens, it sometimes happens, that the person who has the charge of conducting the work has no experience; and it may be he trenches, because he has heard trenching is of great use; but he perhaps trenches without discrimination, and in many cases the garden is left in a worse state, for the purposes in view of the person who has the expence to bear, than before the gardener began to it.

In many situations when it becomes necessary to prepare fruit-borders, it would be found of the highest advantage to form subsoil, by paving with bricks laid in lime morter, with a proper inclination. The expence is nothing when compared with the advantage which would accrue; bricks are kindly for the roots to come in contact with, and even afford in such situations some nourishment for them; we see how the roots of plants cling to the inside of flower-pots. The depth to which the soil should be trenched, should never exceed 20 inches. It should be so constituted by nature, as to be capable to retain a proper proportion of moisture, without being too stiff, or it should be made so by art. With attention to these observations, and avoiding the extremes pointed out, much advantage may be obtained. Borders with such a depth of soil, could easily be kept sufficiently rich; and they might, without any great increase of labour,

be watered in the very dry weather of summer, while by proper draining, they could be kept perfectly comfortable during the rainy weather of winter.

In planting standard fruit-trees in the orchard, or in a quarter in the garden, it is of the utmost consequence to prevent the attraction of the circumjacent humidity to their roots. But it is shewn above, if the soil has been loosened or trenched to any considerable depth beyond the depth of a spade, the accumulation of moisture will infallibly result, and the trees, without doubt, will feel the bitter effects. No soil, I repeat, should be stirred more than 20 inches deep for fruit-trees, and frequently 12 inches may be enough. No pit to receive the plant, should ever be dug deeper than the depth of the surface turned over in ordinary tilth by the spade; if the roots at this depth are properly spread abroad, so as to be benefited by the first powerful rays of the sun, which will penetrate to that extent, the trees will be found the more healthful and fruitful.

I once witnessed an instance of serious injury, by deep trenching, (besides many others which I have to my own cost suffered), which I shall here narrate. A very intelligent gardener went to take charge of a garden of the first order. He found a hot-wall covered with peach and nectarine trees, many of which were quite exhausted by early forcing, by moveable sashes. It was necessary

to root them up, and to replant the border with young ones. In order to prepare it in the most complete manner, he procured a great quantity of well rotted stable dung; and in winter, had the border trenched 3 feet deep. In the operation, the soil was mixed very carefully with the rotted dung, and there was besides a considerable quantity of fresh soil procured, which raised the border when finished, 18 inches above its former height, so that the loose soil was at last $4\frac{1}{2}$ feet in thickness. It was a long time since the adjoining ground was trenched, so that on every side it was quite firm; and in the preparation before noticed, the trenching was at least a foot deeper than the ground had been originally trenched. The border was 4 yards wide, and 200 yards long. The whole was planted with the very best young trained peach and nectarine trees that England could afford; but, to the utter mortification of those concerned, the whole of the trees without exception became sickly the second year after planting, and quite mildewed. Things were no better in the third and the fourth years; and even to the tenth year after planting, the trees had hardly made any progress. Now, indeed, they are something like trees, eighteen years after having been planted; and the reason is obvious,—the soil has become compact, and is not softer than the adjoining soils; but they are not even now what

they would have been by the method above recommended.

I could point out a multitude of similar disappointments in the very best places in the country; and it is curious that the failure in every case arose from an excess of labour and expence bestowed, in order to avoid the very evil which took place. But it might appear that I wished to expose my neighbours, which is far from my desire; and therefore I shall abstain.

I shall conclude this paper with observing, that if the garden is to be made out of a dry pasture field, such as is capable of bearing good crops of wheat, and other grain in agricultural rotation, and trenched only from 16 to 18 inches deep, and less, if the natural soil is not 12 or 14 inches deep; that better peaches, grapes, pears, apples and cherries will be produced, than by the common method of trenching $2\frac{1}{2}$ or 3 feet deep.

KIRKCALDY,
May 1820.

VII.

Further observations on the Preparation of Soporific Medicines from Common Garden Lettuce.

By Mr JOHN YOUNG, Fellow of the Royal College of Surgeons of Edinburgh.

THERE is often a long repose between the acquisition of knowledge, and the application of it to useful purposes; and it sometimes happens, that notices of what might be useful, are met with by those who are desirous of contributing to the advancement or revival of useful science in the works of authors who flourished in remote ages. Such notices or suggestions have frequently been improved, or have given rise to new ideas in the mind of succeeding authors; but there is no branch of medical science in which less progress has been made than in the knowledge of diseases and the means of cure. This may be observed from the writings of medical authors of the present age, in which there is a constant reference to the established doctrines, or hypothetical cogitations of preceding authors, even to the remotest periods of scientific research; and it is no small recommen-

dation to the work of a modern medical author, that it has copious references, and marginal notes. This indicates the appearance, at least, of much study, both in point of reading and of thought; it is the very Essence of *book-making;* and when a man sits down to amuse the world with his lucubrations without this essence, he is not sure, however new and delightful his idea may appear to himself, that it may not be already developed in the pages of the fathers of medicine, who have not only handed down to us the knowledge of all the diseases which we meet with, but also the means of cure. With regard to the various means of cure transmitted to us, some may be said to have gone out of use, some to have come into *fashion;* while others, which have only been hinted at by the ancients, as possessing useful properties, have never been brought into common practice. Amongst others, the *Lactuca sativa*, or common garden lettuce, had long been known to possess narcotic properties. It does not appear, however, that a substance, possessing all the valuable qualities of opium, had ever been extracted from it; and it was chiefly from tradition that its effects were known, especially by observing that people were rendered sleepy by eating of lettuce.

In the year 1792, Dr R. Coxe of Philadelphia, began to try some experiments, to determine the quality and nature of the milky juice which exudes from the common garden lettuce when wounded,

which convinced him of the analogy between the common officinal opium and the milky juice of garden lettuce. And in the year 1810, Dr Duncan *senior* published his observations on the preparation of soporific medicines from common garden lettuce, in the 1st volume of the Memoirs of the Caledonian Horticultural Society. In the 2d edition of his Observations on Pulmonary Consumption, published at Edinburgh in 1816, his words are, "Of all the medicines which I have employed for alleviating cough in phthisis, and indeed as a sedative in many other diseases, next to opium I have found no article so beneficial as that substance, which some have lately denominated Lettuce Opium, and which I termed Lactucarium." And in another part of the same work, he states, that, as a substitute for opium, he never employed one, from which he had seen so great benefit, as from the preparations formed from the inspissated white juice of the common garden lettuce.

Medical practitioners often have to regret that there are particular circumstances which render the use of opium improper, however modified the preparation of that drug may be. In many cases where the preparations of opium are used for procuring sleep, alleviating pain, and in allaying inordinate action, particularly troublesome cough, either sickness at stomach, confusion of head, or a state of constipation is induced; and in some cases, where inflammation prevails, it is aggravated by opium.

The discovery of a medicine possessing anodyne or sedative properties, without producing the distressing consequences that follow the use of opium, in certain constitutions, has long been a desideratum; and as lactucarium appears to possess those properties, it is important that the composition and pharmaceutical preparations of this article, should be well understood by apothecaries, especially as it has but lately been introduced into medical practice. Therefore, without any reference to the particular diseases for which it may be prescribed, it is the object of this communication to show, that the dried milky juice of lettuce or lettuce-opium, as collected by Mr Young's process, from which lactucarium is obtained, contains a very great proportion (rather less than one-half*)

* Mr Young had ascertained by various experiments, that lettuce-opium contained more than half its weight of extractive matter; but since this communication went to the press, he has been favoured with the two following experiments, recently made by Dr Andrew Fyfe.

Experiment 1st.

50 grains of lettuce-opium were put into alcohol specific gravity 835, and digested for seven days; the residue dried weighed 34 grains; the alcohol therefore dissolved 16 grains.

Experiment 2d.

50 grains of lettuce-opium were put into water, and digested for the same time; the residue dried weighed 30 grains; the water therefore dissolved 20 grains, which added to the 16 grains dissolved by the alchohol, make 36 grains,—

which is the quantity of matter soluble in alcohol and water, that is, 72 in the 100, very nearly $\frac{3}{4}$ of the whole.

of a substance resembling Caoutchouc or Indian rubber, which is neither soluble in water nor alcohol, and which must be separated. For, like opium, the medicinal properties reside in the extractive matter obtained from lettuce-opium by the action of water and alcohol.

The lettuce-opium with which apothecaries have been supplied, as collected by Mr Young's method, must be subjected to a pharmaceutical process, before the substance to which Dr Duncan has given the name of *Lactucarium* can be obtained. The lettuce-opium, in the recent state, is certainly fit for making the tincture, or lettuce laudanum. But it must be recollected, that instead of one ounce of the prepared lactucarium to the pound of diluted alcohol, not less than two ounces of the lettuce-opium is required for making lettuce laudanum equal in strength to that prepared by Dr Duncan's process; and that when intended to be given in substance, in the form of pills or powders, or used in extemporaneous prescriptions, in combination with other medicines, prepared lactucarium ought to be kept in the shops of apothecaries.

With regard to the doze of this medicine, it may be observed, that from one to five grains of the prepared lactucarium, has been given to adults; but, like other narcotics, the dose must be regulated by the judgment of the practitioner.

Officinal

Officinal Preparations.

Lettuce-Opium. Lactucarium.
Tincture of Lactucarium or Lettuce-Laudanum.
Lactucarium or Lettuce-Opium Pills.
Lactucarium or Lettuce-Opium Lozenges.

Formulæ for the preparation of Lactucarium and the Tincture of Lactucarium.

LACTUCARIUM PRÆPARATUM.

℞ Succi lactei siccati Lactucæ sativæ concisi et contusi libram unam.

Alcoholis diluti libras duodecim.

Digere per dies septem, et per linteum cola. Alcohol è liquore colato destillatione abstrahe. Tum residuum, in balneo aquæ ferventis muriate sodæ saturatæ, redige ad idoneam spissitudinem.

TINCTURA LACTUCARII*.

℞ Succi lactei siccati Lactucæ sativæ uncias duas.

Alcoholis diluti libram unam.

Digere per dies septem, et per chartam cola.

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* For the other preparations of this medicine, see Dr Duncan's Observations on Pulmonary Consumption, 2d Edition, 1816. See also Horticultural Memoirs, vol. i.

VIII.

On the soil best suited to Peach-Trees, and on the injurious effects of Dungs.

In a Letter from Mr James Kirk at Smeaton to the Secretary.

(Read 6th July 1820.)

Sir,

Some years since I communicated to the Caledonian Horticultural Society, the way in which I managed the peach-trees in the garden and hothouses of the late Sir George Buchan Hepburn of Smeaton, Baronet.

I now take the liberty of laying before your Society, the method I adopt for preventing mildew upon peach-trees in the same garden.

When I got the charge of these trees twenty-one years ago, they were overrun with mildew, and in a very unhealthy state, insomuch that most of them were to appearance not worth keeping. I examined the earth about the roots, and found that, the soil having been much exhausted, a great quantity of dung had been given. I took this old soil wholly away, and put fresh soil, procur-

ed from a very old pasture, to the roots of the trees, without any dung, always exercising the greatest care possible not to injure the roots.

I only treated a few trees in this way the first year; but I found it answer well, and I afterwards went over all the peach-trees in the same manner. I have continued giving them a little fresh soil from old pasture, every two or three years since, always without any dung.

By following this plan for the last twenty years, there has not been the least appearance of mildew during that long space of time upon the peach-trees in the garden at Smeaton. Some of the peach-trees in the hot-houses are above forty years old, yet in the greatest health, and every year bearing great crops. Some of the peaches in the hot-houses were 11 oz. weight this season.

When I plant any trees out in the garden, I always take a little of the fresh pasture soil and put about their roots. This I have found has a great effect, in promoting the pushing of young roots, which are not so freely produced in the old soil.

I may add generally, that I have uniformly observed, that the application of dung to the roots of fruit-trees is a great encouragement to mildew. I am, &c.

PRESTONKIRK,
1st *July* 1820.

IX.

On the advantage of Grafting the Ribston Pippin on other more healthy Apple-Trees.

In a Letter from Mr JOHN DICK to the Secretary.

(Read 2d December 1819.)

SIR,

I PRESUME to lay before the Horticultural Society, a simple method which I have had in view for years bygone, and have begun to put in practice, by permission of my master Sir David Wedderburn, Bart. of Ballindean, of endeavouring to improve the health of the Ribston Pippin apple-tree. In all districts of this country, this fruit is much given to canker, especially upon standard trees.

It is a fact well known to all who have experience in the art of horticulture, that those kinds of fruit-trees that have not their wood well ripened in the autumn, never produce fruit so well as others whose wood acquires maturity.

The Ribston Pippin in general produces very strong wood, which is often not ripened upon standard trees, and therefore is ready to canker. I have seen this take place myself in a

good soil, where other apple-trees and pear-trees were doing well; but in their habits of growth, these last made much finer wood, which was sooner ripened than that of the Ribston Pippin in a bad autumn; therefore, the bearing wood and fruit-buds were not hurt by the winter frost, and consequently they continued to bear fruit. I shall refer the experienced to a simple glance of Ribston Pippin trees upon walls, how they produce good fruit, by having their wood well ripened. Here they are not so liable to canker, or to injury from frost or bad seasons. It is a fact, that a Ribston Pippin removed from a bad soil or situation, and put into a better, will grow healthy in time. A Ribston Pippin should always be planted in the best situation of the garden or orchard.

Every one has not so good soil as he could wish, although most people wish to have good fruit. I shall say nothing about what soil may be best, but leave every one to his own ideas upon that point.

The method I am to mention is within the reach of every person that can have a few fruit-trees upon standards or espaliers. All that is necessary, is to procure some Paradise Pippin apples that have been wrought upon good crab stocks; for the Paradise Pippin being a very healthy apple-tree, and the wood very fine and vigorous, so the Ribston Pippin being grafted on it, is enabled to make much finer wood, and to ripen its wood, so as to produce fruit abundantly, either upon standard or espalier trees. It is well known, that

by putting a weak-growing tree upon a strong growing tree, the weak one will grow much stronger than it would otherwise do. The easiest way is to get from the nurseries, a few Paradise Pippins upon crab-stocks, and plant them where they are to remain. They will soon be ready for receiving the Ribston Pippin; and these regrafted plants will quickly make very fine trees, either for standards or espaliers, or even for the wall. I am, &c.

BALLINDEAN,
30th Nov. 1819.

X.

On Forcing Sea-Cale and Asparagus in the Vinery.

In a Letter from Mr Adam Melross to the Secretary.

(Read 2d March 1820.*)*

Sir,

In the forcing of Sea-cale, I have fallen upon a plan which succeeds remarkably well, and which I have seen nowhere practised. I lift a quantity of plants, strong enough for producing good heads, and plant them along the back of the flue in the vinery, where no vine roots are. I place the covers upon them, and in two weeks (when the heat for forcing vines is kept up) I have as fine sea-cale as could be desired. Twelve covers will supply the family. A constant succession may be had, by lifting the roots when a dish is cut, and supplying their places with fresh roots from the open border. This way is much better than forcing sea-cale in pots, and much easier than with dung, especially in so wet a climate as this. By sowing a little seed yearly, and planting out a few rows of the seedlings, it is very easy to have a constant supply of proper plants.

Asparagus, I find, may also be forced in the same situation, though not with the same facility. I am, &c.

Ardgowan,
25th Feb. 1820.

XI.

Suggested Improvements for the Regulation of the Conservatory, &c.

By John Murray, Esq. Lecturer on Chemistry, &c.

In a Letter to the Secretary.

(Read 2d March 1820.)

Sir,

It must have, I think, been obvious to the reflecting horticulturist, that the *thermometer* should not be the only meteorological instrument in a well regulated stove or conservatory.

It appears to me, that the *hygrometer* is as essential as its fellow, and ought to accompany it. It need not be told how injurious a humid atmosphere is to plants,—that it is the herald of disease and death, and the medium of numerous insects, inimical to healthy vegetation, either directly introduced, or the consequence of that disease, which is a result of its action.

The hygrometrical machines of De Saussure and De Luc are both excellent, but are certainly exceeded in delicacy of action and sensibility of

change, by the inventive genius of Kater and Wilson; but though these are justly approved, I cannot, on my own experience, allow them a precedence over the elegant and accurate instrument of Professor Leslie.

With the latter hygrometer, I have made numerous experiments at various altitudes in France, Switzerland and Italy, as well as in the British Isles. The results were always satisfactory, and the consequences I had deduced from them never deceived me.

The instrument in question is accurately described in Mr Leslie's work, entitled, "A Short Account of Experiments and Instruments," &c. Edinburgh, 1813, 8vo.; and consists essentially of two connected tubes terminating in balls, of nearly equal height. The tubes contain sulphuric acid, tinged with carmine; and its altitude is determined by the contraction and expansion of included air, as affected by external agency. One of the balls is of coloured glass, and the other, including the supply of tinged liquid, is covered with some folds of tissue or blotting-paper, under a film of azure silk. The covered ball is thus wetted, and the evaporation which ensues, denotes the comparative dryness of the atmosphere, by corresponding depressions of the fluid, as indicated by the scale. The appendage represented in Fig. 5. of that work, seems best calculated for the horticulturist, as by it the instrument is kept in

continued action, being fed with moisture by means of fibres of silk. These may terminate in a bulb-glass or caraffe full of water, the elevation of which is a little higher than the instrument. The threads are previously soaked in hot water, to remove any gum that may adhere to them; and occasionally freed from dust, by washing, to insure their continuous capillary action.

When the instrument does not indicate above 15°, we may assume that the air is damp. From 30° to 40° we may consider it dry; from 50° to 60° very dry; and intensely so from 70° upwards. To support a proper equilibrium, which must, however, have its diurnal as well as annual grade, should be the gardener's chief care and study. An unhealthy redundancy of moisture may be provided against, by the use of some absorbing materials. By the researches of Professor Leslie, the carbonate of lime, chalk, &c. produces a degree of dryness equivalent in comparative value to 70°; pipe-clay 85°, and decayed trap or whinstone 86°. The substances in question are dried completely, or rather almost roasted before a fire; and the flue heat might be made available for this purpose; while the same portion may be employed indefinitely to perform its circle of changes. Parched or torrefied oat-meal may, as experiment has since shewn, be advantageously substituted in lieu of the substances just named.

When the atmosphere is too dry, the case may be remedied by means equally simple and efficacious. Shallow vessels containing water, will soon restore the salutary equilibrium, and minister to the luxuriance and beauty of the vegetable tribes.

To the miscellaneous group from "every tribe and kindred" displayed in the conservatory, it may be urged, that such an equilibrium could not successfully apply. The same objections, however, might be brought against the thermometer itself. The geographical distribution of plants has shewn us, that there is as great a diversity in tropical vegetation with respect to hill and valley, and the latitudinal extremes, as in that which chequers the progression from the equator to the poles. There is a hygrometric excess on either hand, which may prove destructive to a varied vegetation, particularly plants which have been for some time subject to a common treatment. It will be generally found, that abrupt transitions, whether thermometric or hygrometric, prove more or less destructive; and that there is a uniformity in both, which will yield a salutary mean. It would indeed be well to separate always the succulent (as the Cactus, Euphorbias, Mesembryanthemums, &c.) from the woody kinds, by a proper partition; and I shall endeavour to shew, that the same flue heated from the same source, may be made to communicate a diversity of temperature in its progress.

Experiment clearly discovers, that heat radiates from surfaces, and in different degrees from different substances. Those that have a polished metallic surface, for example, radiate less caloric than those covered by vegetable substances, lamp-black, &c. Their comparative radiant powers, may be numerically represented: The surface, clouded by lamp-black, is 100°, that of tin 12°; and with this interesting fact before us, it is evident that the flue may be continued the whole range of building. The compartments which require the *higher* temperature must have the flue-surface covered with *lamp-black*, while those that demand a *lower* heat must exhibit a flue coated with *tinned iron*.

It must, I conceive, have been evident to the most careless observer, that a stagnant atmosphere is injurious to plants; and yet no means, as far as I know, have been adopted to promote a free circulation of air. A fresh supply might be uninterruptedly supported by a pipe, parallel and in contact with the heated flue, one extremity communicating with the external atmosphere, while the other orifice terminated in the house. In this disposition of things, a continuous current of fresh air, heated in traversing the cylinder, would be supplied. Some provision should be made in the highest part of the roof, for the exit of excess of heated air, and to carry off the aqueous deposit formed by the cooled atmosphere, the consequence

of contact with the glass during night. This aperture might be supplied with a concave lip, like that in the interior of the capital of an alembic, and furnished with a discharge pipe.

The ingenious mechanism of Mr James Kewley, briefly adverted to in "Abercrombie's Practical Gardener," is certainly admirably calculated to support an equilibrium of temperature, and to provide for any excess of heat. Having myself seen the machine in successful action, and when it began to operate with an excess of 0°.5 of Fahrenheit, I can pledge myself for its accuracy. Still, however, its expence will preclude it from general use. It has appeared to me, that a very simple contrivance would suit the purpose. Let the pipe entering from without be supplied with a *valve opening inwards*, and so compensated in weight, that it will open by the external air, when the included temperature is of any required degree; and let the exit orifice above, be furnished also with a *valve opening outwards*, and similarly compensated. Such seems to me all that is required. In every room heated, there is a continued circulation of air going on. When the door is opened, and a candle is placed on its threshold, it will give evidence of an influx of cool air by the flame of the candle being bent *inwards;* near the top of the door the flame inclines *outwards*, exhibiting an efflux of heated air. In fact, by a stati-

cal law, the cool and denser air descends, and the heated and lighter air ascends.

Chemical experiment has unequivocally decided, that the plants meliorate the atmosphere when acted on by bright sunshine, by the evolution of oxygen; this medium is deteriorated by the fixed air or carbonic acid gas exhaled at night. That healthy vegetation may be supported for some time at least in an atmosphere with excess of carbonic acid, I am not so hardy as to deny; but there is even a limit to this, and a period at which the mephitic air becomes noxious. I could discover no traces of vegetation, nor even the rudiments of agamous or cryptogamous plants, in the *Grotto del Cane* near Naples, nor even on the soil traversed by the fixed air before it falls into the lake *Agnano*. *Lime-water* or *cream of lime* conveniently placed in proper vessels, will absorb the excess of fixed air not carried off in the process of ventilation recommended.

An ill-managed stove often exhales a mouldy, &c. smell, arising either from a damp and stagnant atmosphere, decaying foliage, or vegetation in a more advanced stage of decomposition. The action of *chlorine* would doubtless counteract the evil induced by neglecting the use of proper means. Its efficacy, I know, has been proved by Count Dandalo, in the case of the silk-worm; and why should it not be useful in the case now considered? Guiton de Morveau's Preservative Phial,

as improved by M. Boullay, I should recommend, because, by it the escape of the gas is easily adjusted and modified. The apparatus consists of a box containing the bottle with the ingredients, viz. a little black oxide of manganese and muriatic acid. The top of the box contains a forcing screw, which contains interiorly a bit of flat ground glass, adapted to the orifice of the bottle, and which may be turned from outside of the box; thus at pleasure confining the elastic gas, or suffering it to escape in such portions as may be requisite, through two apertures provided at top.

The experiments of Dr William Charles Wells, as detailed in his "Essay on Dew," &c. London, 8vo. 1814, p. 124, &c. inform us, that there must be a superior advantage derived from placing the mat or other covert intended to defend tender plants from the cold of clear and calm nights, *a few inches distant* from the surface, rather than in contact. Such a provision acts, *not* in virtue of its simply preventing contact with a chill atmosphere, but of impeding the *radiation of heat* to the sky. When the mat or canvas is in contact, it receives an accession of temperature by this means, and the *evaporation* of the dew deposited from the chilled atmosphere, carries off the communicated heat.

Some or all of these hints may be useful; they are founded on just philosophical principles; and I have experimentally proved their value in analogous circumstances; nor will the intelligent gardener despise them. Let it never be forgotten, that the man of science is simply "the Interpreter of Nature." The phænomena he has observed and studied, are consigned to the arts; and the practical genius of our country makes the application to the comforts and conveniences of life, or the ornamental and useful branches of an improved society.

STRANRAER,
15th Jan. 1820.

XII.

Various Horticultural Notices Communicated by Mr Murray, Lecturer on Chemistry, &c. to the Secretary.

1. *Remarks regarding the Yellow Rose.*

Perhaps a remark on the *Yellow Rose* (Rosa lutea, fl. pl.) may not be altogether uninteresting to the Caledonian Horticultural Society. It unfolds its petals irregularly in this country; and there is nothing more rare, than to see a perfect evolution. It is even so in France, and equivocal in Italy itself; of which country I believe it indigenous.

The Yellow Rose, I was informed by a florist of central Italy, is generally imperfect even there, and is especially remarkable when kept insulated in the centre of a garden, but when placed *close to a low wall*, with an *aspect to the east*, it then succeeds well enough.

Some have attributed the failure to a too fertile soil; others to other causes; all equally hypothetical. In Italy, the rose-bud, when mature,

is not unfrequently transferred to a caraffe of water, where it expands regularly.

I have made several experiments on the effects of a *copious supply of water* on the expansion of the flower-buds of the China Rose, (Rosa semperflorens), and have no hesitation in saying, that this will cause a *prompt evolution of the petals, and in regular order;* in cases where, reasoning from analogy, the rose-bud would not have bloomed, or would have exhibited only an imperfectly expanded corolla.

The experiment in question, we may reasonably infer, will apply with success in the case of the Yellow Rose, and to other plants equally shy in the display of their blossom; and the very circumstance of the bud freely expanding in water, offers a striking corroboration of the fact.

It frequently happens, that fruit wall-trees do not afford regular lateral shoots on either side. Such are in consequence unsightly; and in order to fill up the gaps, it becomes desirable to have branches from dead eyes or buds. In order to force such, it was usual to make above these eyes, a simple transverse incision, penetrating even to the wood. The French have improved upon this method, by making it in the form of an inverted V, thus Λ. I can assure the Society of having, in numerous instances, met with the most

perfect success in following this method; and I have also witnessed well filled up trees, in cases where the system has been acted upon on my recommendation. I fancy that I have slightly improved upon it, rendering it less equivocal. In order to prevent the edges cohering after division of the bark, which may sometimes cause a failure in the experiment, I remove a very *narrow strip of the bark.*

2. *Notice regarding the Hyacinth and Tulip; and method of destroying Earth-Worms.*

Mons. M. V. Provanchère Baudry, successor to Mons. Tripet, a celebrated florist in Paris, informed me, that he was wont to lose a considerable number of hyacinth bulbs, until he adopted the following simple expedient:—the bulb is conveniently placed with its base upwards, and suffered so to remain. This is found an excellent preservative for them during the season; and by that means he assured me, that not one bulb was lost. Now, as these roots are frequently imported from Holland in a moist state, similar treatment will be an effectual guard against their loss. It is obvious, that this management applies aptly to all bulbs whatever, the more succulent of which it is oftentimes difficult to protect and preserve.

A series of frequently repeated experiments have revealed to Mons. Baudry, a curious fact with

respect to the *tulip*, namely, that if the *convex* part of the bulb be planted to the *south*, the tulip will expend itself in leaves, but when the *concave* side is so placed, the flower is certain. I state the circumstance as reported to me; but have had no opportunity of verifying the observation.

The method of destroying such earth-worms, &c. as are injurious to the florist in France, as communicated to me by a gentleman from Montpellier, is ingenious. A *drop of oil* is let fall into each worm-hole, and water then poured in, when the worm or insect comes to the top along with the oil, which necessarily ascends and floats in virtue of its low specific gravity. I have had no opportunity of making the experiment; and perhaps this may be extended to other creatures hurtful to the cause of horticulture, and suggest applications more diffuse.

3. *On the means of affording Plants shelter from Frost, &c.*

The ingenious Essay of the late Dr Wells has given us new views on the subject of Dew, by shewing that its formation depends on the radiation of heat from the earth to the heavens. Thus, a clear sky, and the absence of winds, are favourable circumstances; but interposing clouds, and an agitated atmosphere, prevent its formation, or disperse it when it is formed. No dew forms on the

summit of lofty mountains, because, though there is a purer sky, the extreme siccity of the atmosphere precludes the deposition of moisture upon the cooler surface. We become sensible of a superior degree of cold, on leaving the house at night, under a clear unclouded sky; but when a screen of clouds veils the hemisphere from us, we do not feel so chill. On this principle, the animal heat radiates from the system to the heavens with more rapidity in the first instance, than the operations of the animal economy can supply its expenditure.

When the horticulturist screens his conservatory with matting, it is not to cut off the cold air from communicating with the exotic plants, but rather to prevent the heat which emanates from the plant or the bed radiating to the sky, and expending itself in vacuity. This coverlet finds its analogy in the heavens. Clouds, by their interposition, prevent the too rapid cooling of the terrestrial surface. So does the mat prevent the too rapid cooling of the surface it covers; but the horticulturist ought never to forget, that his object is best gained when the mat is *not in contact* with the frame, but raised a few inches above it, and a thin covering will serve the purpose as well as a thick and unwieldy mat. I may say *better;* for when the thick mat in contact with the frame is moistened by the evening and morning dews, it becomes a conductor of heat, and as much or more heat is expended in evaporation, than is prevented

from escape by radiation. It is astonishing what a little matter judiciously applied will do, when guided by scientific skill. I shall likely, on some future occasion, apply the laws which regulate the movements of caloric to the structure of hot-houses, and the protection of wall-trees, &c.; meantime, I may adduce in illustration, the method of securing the vine from the effects of frost, as now practised successfully in France. Before each vine-stock is placed, to face the east, a slim shelter, such as a bough of the pine which is attached to the prop or pale, which supports the vine. This shelter protects the weak plant from the too sudden action of heat after the cold of the night. An abrupt transition from cold to heat must always prove destructive,—a circumstance too frequently unattended to in horticultural concerns.

I may add to these remarks, while adverting to the vine, that in France it is now the custom to make annular incisions on the shoot, when in bloom, to prevent the vine from running; and it is asserted, that the best effects have resulted from the treatment. An instrument for this express purpose has been invented in Paris.

A very ingenious application of the thermometer to ascertain the temperature of hot-beds, and which may be useful to the horticulturist, has been invented by Mons. Regnier of Paris. The

thermometer is included in a wooden case, of the form and size of the ordinary garden-dibble. This is lined with green baize, and caped with tinned iron, to prevent the action of external temperature. The end which enters the earth is shod with copper, (a good conductor of heat,) and perforated.

4. *On the watering of Fruit-Trees.*

I notice a communication from M. Sowerby to the London Horticultural Society, wherein the advantage of watering fruit-trees well at the time of the *setting* of the fruit is pointed out. By this method, in 1815, a tree produced a great number of pears, nearly a pound weight each, which, the year before, afforded only a few, half that weight. It may not be out of place to remark here, that I found at Terracina, in an orangery, the practice of watering adopted with success, for the *maturation of the fruit.* Cavities for the water, which was supplied in abundance, surrounded each orange tree; and I was assured, that its effect was always decided; that it accelerated the maturation, and improved the flavour of the fruit. Its applicability ought not to be confined; for it is obvious, that all fruit-trees whatever may benefit from such a practice.

5. On the Vegetation of Bulbous Roots in Water.

I made last winter some experiments on bulbs growing in water, chiefly with reference to a transition into varied media, and a short detail of some of them here, while they afford information with regard to the functions of the roots, may not be deemed uninteresting. The bulbs were those of the hyacinth.

The Dutch keep the hyacinth when newly placed on the bulb-glass for some time in the dark to induce good roots, and for this purpose, by way of comparison with other bulb glasses, I used coloured ones. The fibres of the root seem generally to attain a greater length in coloured glasses, in the green especially. In the blue, the fibres are marked by the singularly strong ones which subsequently surround the margin.

The very strong swollen fibres which characterise the latter stage of the plant, are perhaps connected with the evolution of the flower at that period when it should declare itself. At any rate, there are two distinct series of roots, and the primitive, more minute fibres, shrink when the others emerge.

A bulb fed with a solution of carbonate of ammonia continued healthy, and flowered well; but the roots did not greatly elongate.

One hyacinth bulb was inured to repeated additions of salt water till sea water was finally used;

it continued to grow, but was not so luxuriant as the others.

A bulb fed with diluted pyrolignous acid did not seem materially affected by the new medium, and the fibres seemed to have decomposed the acid matter in contact.

Repeated renewals of the water seem to ensure health and luxuriance, and more rapid growth. The probability is, that there is an appropriation of the air contained diffused through the water, which is in time exhausted, and, according to M. Gay-Lussac, the air contained in water has an excess of oxygen.

6. *Notice regarding the Agave Americanum.*

The *Agave Americanum* is said to flower only once in a century. This much we know, at any rate, its flower is a rare phænomenon in the British Isles. Not a few, however, may be seen in flower on the sides of the highway from *Terracina* to *Capua*, on the road to Naples. I think it obvious, from an attentive examination of many of these plants, that this *Agave* flowers only *once*, and that having provided for its perpetuity by an offset, the whole energies of the plant are expended in the flower, which being matured, it perishes. The most magnificent flower of this species I ever saw, was growing on an exposed rock in one of the Borromean islands, called *Isola madre*,

in the "Lago maggiore," north of Italy. I measured the flower stem, or *pedunculus*, and found it *twenty-eight and a half feet in altitude*, and its *circumference*, where it emerged from the leaves, *two feet ten inches*. It was a superb spectacle.

I was inclined to consider this plant as *indigenous* to Italy, but Sir James E. Smith tells me he is not of this opinion. It is, however, common in that country. It crowns the *walls* of the city of Genoa, where it even flowers; and I have seen whole fields, near *Pontercule*, fenced in entirely with the *Agave Americanum*.

The plant sketched in *fresco*, on one of the walls of Pompeii, supposed to be an *Agave*, and which would assign a distant date to its introduction into Italy, does not appear to me (and Dr J. F. Schouw joins in the opinion) ever to have been intended for the plant in question.

7. *On the Uniformity of Insular Climate.*

The temperature of springs has been pronounced an index of the mean temperature of a country. The sea preserves a uniform temperature, and is not subject to variable heat or cold: the consequence of all this will be, that the air incumbent on the bosom of the ocean will participate of this mean temperature, and by mingling with the atmosphere pendant over small islands, by a tendency to an equilibrium, impart to it a uniformity

not enjoyed by inland tracts of country. This is in some measure participated in by such soils as border upon the sea coast; an earlier vegetation and maturity always characterise them. They are not checked by those sudden transitions which mark other situations. An island in the ocean may be compared to a garden-pot plunged into a bed of equal temperature. In inland countries, vegetation must be more affected by the rapid variations which result from radiation and other causes, and which have no compensating curb. Numerous are the facts which I have collected, and which go to establish this opinion. It would be unnecessary to adduce them here. In the "Isola Bella," and "Isola madre," are plants exposed, and always unprotected, which, even in southern Italy, would be sought for in vain under such circumstances, as the *Arundo saccharifera*, *Coffea arabica*, &c.

XIII.

Horticultural Communications received by the Secretary from the late ALEXANDER KEITH, *Esq. of Ravelstone.*

1. *Account of a mode of Ventilating Hot-Beds, with Air moderately heated.*

(Read 10th June 1817.*)*

THE glass frames of hot-beds being seldom more than 12 or 15 inches from the earth or bed, the air within is soon rendered unfit for vegetation, by the putrid fermentation of the dung, and by the vegetation of the plants, unless the cold outward air is almost constantly admitted, which can only be done by raising the frame one or more inches, or by making an opening in the back part. But it generally happens, that fresh air cannot be introduced without injuring the plants by the cold, which must enter with it.

In order to remedy this, and to introduce fresh air moderately heated, the following invention occurred many years ago. I procured a thin lead-pipe of about 2 or 3 inches diameter, bent nearly

at a right angle, each bend of the pipe being about 3 feet long; one of the bends was placed horizontally in the dung, while the hot-bed was forming; and the other rose perpendicularly into the open space between the earth and the glass frame, so that the air in the pipe, when heated, by passing through, or communicating with the hot dung, became lighter, and consequently rose into the space between the earth and glass-frame; whereby this space was ventilated with fresh air, which was heated according to the temperature of the dung, which is always several degrees warmer than the outward air, especially in the night time, and during the absence of the sun. Hence, a continued circulation of fresh air may be obtained during night as well as day. It may be also observed, that the entry of mild air will occupy the space, and prevent the entry of cold air from without. The air which has been rendered unfit for vegetation, will escape through the overlappings of the panes of glass. All this will be fully understood, by looking at the drawing which accompanies this.

It is acknowledged, that too few experiments have been made to illustrate the benefit of this invention, considering it is above twenty years since I first put it in practice. I soon after erected hot-houses heated with flues, which rendered it of less importance to myself. I am now advised to make the invention better known; and

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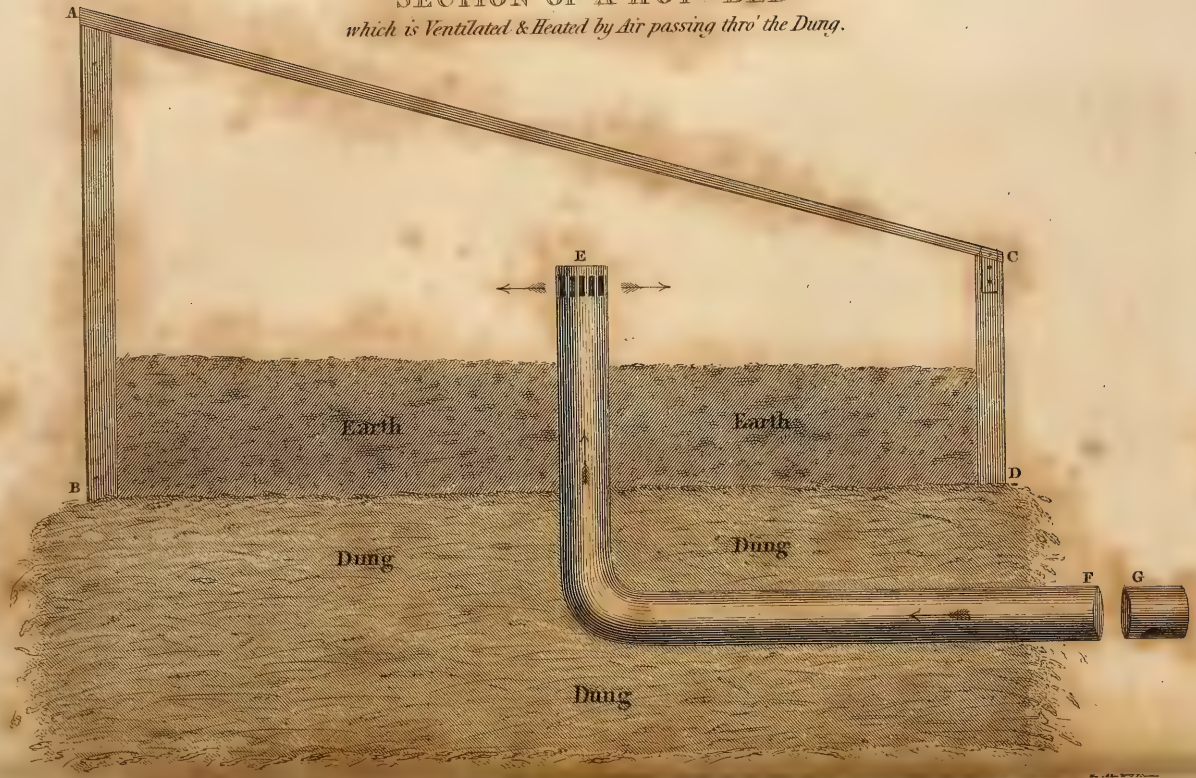
SECTION OF A HOT-BED

which is Ventilated & Heated by Air passing thro' the Dung.



I flatter myself, that improvements will be made by those better qualified, and who have more opportunities of trying such experiments. I can give this encouragement, that a contrivance for ventilating and heating dwelling-houses by hot-air upon a similar principle, which I put in practice twenty-five years ago, has turned out to great advantage.

RAVELSTONE,
9th June 1817.

Explanation of Plate II.

A B C D, the section of the wooden frame.

E F, the lead pipe placed in the dung, which admits the fresh air, and allows issue at the holes under E G, the cap which covers the mouth of the pipe having a hole in the under part, by which the quantity of air can be regulated.

2. *Notice concerning an extraordinary produce from one Potato.*

A single large potato having been brought from Rannach in Perthshire, the estate of Colonel Robertson of Struan, to Ravelstone, and cut into twenty parts or divisions; and after having been dried three days upon the flues of a hot-house, was planted, 25th April 1815, in the garden, on earth which had not been dunged the former year. The plants were placed in two drills, at 3 feet distance, and 2 feet distant in the line or drill. Four of these cuttings never vegetated; the remaining sixteen were from time to time heaped up with earth, until they rose to the height of 3 feet.

The whole produce having been taken up upon the 24th day of October, were carefully measured with a potato peck measure, (of 28 lb. weight). They amounted to 7 pecks full measure.

It is to be remarked, that these plants never came to the length of putting out any flowers. It is therefore probable, that they would have continued to increase the number and dimensions of the tubers or potatoes, until they had been checked by the frost: For it will be observed, that the potato continues to put forth tubers until blossoms appear.

XIV.

On saving the Bark of Young Trees from the attacks of Hares, and on preserving Cauliflower Plants during winter.

In a Communication from Mr William Bull to the late Mr T. Dickson, Secretary.

(*Read 3d December* 1816.)

I.

The mode of preventing Hares from eating the rind of young fruit-trees and shrubs, during winter, is very simple. It consists merely in laying over the stems or trunks with cow-dung. The dung should be fresh from the cow-house, and rendered so liquid with the urine collected in the same place, as that it may be of the consistence of paint, and be applied with a painter's large brush. I may mention, that if the workman be not over-nice, the hand will be found the most expeditious mean of application; all that is necessary being to clasp the stem near the ground, and draw the hand upwards for 2 feet or more, dipping it occasionally in the mixture. A garden barrow-load of the

stuff will be sufficient for 100 trees, with stems of 3 or 4 inches in diameter; and if the hand be used, one man can go over 300 trees in a-day. In this way, it will be observed, there is no occasion for disfiguring the trees with straw-bands, broom or furze, or any thing else round their stems; and, after a very few days, the cow-house paint has neither an ugly appearance nor offensive smell. The virtue of the paint in disgusting hares from troubling the bark, remains for at least two years; in some cases, for three years. In trees which have the bark very smooth, the application should however be repeated every season, at the approach of winter. The Cytisus Laburnum, for example, has a rind polished like glass; and hares seem particularly fond of the bark of this tree, and attack it more readily than even young fruit-trees. The stems of Laburnums should therefore be smeared every year. We have a great number of those trees in the shrubberies at Rossie Priory, which would soon be killed if not attended to in this way; for hares are here very abundant, and our shrubberies and nurseries are all open or not walled in.

I may observe, also, that the trees seem to receive considerable benefit from the cow-house paint, their stems becoming quite clear, and their growth being more luxuriant. Those trees especially that had formerly been barked by the hares, soon throw out a fresh rind under the paint, and then take on a new and vigorous growth.

I should like that some of the members of the Horticultural Society would try this simple mode of preventing the damage done by hares during winter. It is attended with no expence, and has with me proved very effectual.

II.

Regarding the preserving of Cauliflower plants during winter, I find, from experience, that if cauliflower seed is not sown till the last week in August, and if the seedlings are not transplanted till the middle or near the end of November, before the hard weather set in, no sort of covering is necessary, nor any other protection than that afforded by a wall having a south aspect. In such a border, and without any covering, young cauliflower plants have uniformly stood well for many successive winters past, and have always proved better and sounder plants for spring planting than such as have had additional shelter. The seedlings protected with glass-frames generally grow too gross in the stems, which become partly blackened; and the plants being thus unhealthy, are not fit for planting out. Late raised seedlings which spend the winter in the open border, uniformly become the largest and finest table cauliflowers during the summer, though they certainly do not come in quite so early. For my principal crop

at Rossie Priory, my bed of seedlings is nearly 3 feet wide, and 30 feet long; the plants are about 4 inches apart; and the inmost row is 7 inches from the bottom of the wall. The seedlings raised late in autumn, seem to be very tenacious of life. I have noticed some neglected plants which had accidentally lain on the top of the ground all the winter, continue to be fresh and good in the beginning of March. Cauliflower plants, it is probable, are often killed with too much attention. I have sometimes had beds of seedlings which have stood a moderate winter, without even the protection of a wall; and I have seen cauliflower plants, which were carefully protected with glass-frames and mats, yet nearly all blackened in the stems, and unfit for planting out.

Rossie Priory,
1*st Dec.* 1816.

XV.

Horticultural Gleanings.

By Sir G. S. Mackenzie, Bart.

On looking over the London Horticultural Transactions, I find an objection to the general cultivation of the Rose Strawberry, which may be applied as well to every other variety. It is known, that strawberries when ripe, are apt to hang near to the ground, and sometimes to lie upon it, and, especially in rainy weather, to be much soiled. I am very much surprised at the obstinacy of gardeners in refusing to practise the ancient method of preserving strawberries clean. I have many times desired my own gardener to use different methods of effecting this; but in vain. The ancient method gave the name to the fruit; and consists simply in pegging down a thick straw rope on each side of the rows of plants. This simple practice, besides supporting the plants, and keeping the fruit clean, prevents the heat during scorching weather from affecting the roots; and the produce is consequently better and greater.

Bricks set on edge would be a neater material for the purpose, and equally effective; but would probably be objected to, on account of the trouble of setting them and taking them up again, however little that trouble may be. But no gentleman ought to keep a gardener who does not understand that there is time enough for every thing, provided that time is not wasted, but properly regulated, and nothing too long delayed. The word Trouble should not be found in a good gardener's vocabulary.

A great deal has been written on methods of destroying Insects; and we seem to be notwithstanding as much annoyed with them as ever. Indeed, of all the recipes that have been announced, not one has been found of real utility. There is but one substance that can be applied with effect and safety, and that is the smoke of Tobacco. But this is an expensive article, on account of the revenue that is drawn from it; and it is not likely that the same favour will be granted to horticulturists with respect to tobacco, that agriculturists have received with respect to salt. I think, however, that no objection would be made to gardeners raising this article for themselves in a quantity to be useful, if the matter was properly represented to Government There is no difficulty in applying tobacco smoke in a forcing, or in any other description of hot-house; and the easiest method of applying it

to trees on the open wall is to hang mats over them, or common sheeting, to confine the smoke. Although I have not yet made the experiment, I am sanguine in my expectations, that kindling straw or wood shavings, or dead branches of trees, or furze, &c. in such situations, according to the direction of the wind, as will allow the smoke to spread through the garden, and repeating this often, would be attended with great effect in destroying insects. The ingredient in smoke which chiefly contributes to the destruction of insects, I take to be the pyrolignous acid; and it occurs to me, that this, which is by no means an expensive article, might, in a diluted state, be applied with great advantage to trees infested with insects. I should think that a quart of the acid would be sufficient to be added to the quantity of water held by an ordinary garden engine when full. It might also be applied in the form of vapour in vineries, peach-houses and stoves. Should my expectations of the pyroligneous acid be realised, it is easy to foresee, that in every place where an extensive range of hot-houses has been built, and where wood is abundant, a gas apparatus will be erected; for, by using wood, the acid will be obtained in abundance; the gas will be used either to light the mansion-house and offices, or to heat boilers for producing steam for the forcing-houses, &c.; the charcoal will be highly acceptable to the cook, and the tar will be useful for painting gates and palings. I cannot imagine any method of heat-

ing boilers nearly so good as that of burning gas under them, because the heat is so easily regulated, and so steadily kept up without attendance or risk. Indeed, the advantages of this are so great, that, without any other object in view than the production of steam, an apparatus for producing gas, when wood is abundant, will be profitable, as the gas may be procured at the same expence of fuel, as would be required for a boiler placed directly over the fire. These hints will be quite sufficient to intelligent horticulturists. I might dwell longer on the subject, but I must proceed with my more humble occupation of gleaning.

If I remember well, it is a rule laid down by Mr T. A. Knight, that, in the treatment of Peach-Trees, no greater number of young shoots ought to be left to grow than what may be required for fruit the following season. I have not the least doubt that such treatment will suit many situations perfectly. I have as little reason to doubt what is stated by Dr Noehden on the management practised by Mr Harrison, gardener at Wortley Hall, being there completely successful. Mr Harrison's practice is to lay in as many shoots as possible, and to shorten them to ten or twelve buds. To preserve the blossom, Mr Harrison waters the trees in the morning, after frosty nights; and it is evident, that by thus gradually thawing the blossoms, they will recover, at least that many will be saved. I believe

that the coverings usually given to early blossoming trees act as beneficially, by keeping off the rays of the sun, and thus preventing the blossoms being too suddenly thawed, as by keeping off the intensity of frost. The success of both the practices to which I have referred, leads me to remark, that while every gardener will do well to try experiments which have succeeded with others, he must not expect success in every instance, nor be astonished that a reverse practice should answer his views better. There are thousands of circumstances connected with the physiology of vegetables, of which we know as yet little or nothing, that may lead to the most wonderful changes in their habits, when they are taken to a new climate, and placed in a different soil. There are also circumstances in soils which cause alterations of habit, of which we are still ignorant. At present we can only become skilful each in his own garden; and I apprehend we must all lower our tone, and speak of what we may effect, without recommending our practice to others.

There is a paper in the 3d volume of the London Horticultural Transactions by Mr Williams, on the causes of decay in fruit-trees. He remarks, that disease is not always the consequence of old age, since trees become cankered, and are attacked by a variety of diseases at a very early age. He attributes decay very much to the fre-

quency of cold summers; being confirmed in his notion, by having seen, during some seasons of considerable warmth, a great change to the better in several orchards. There can be no doubt of a deficiency of heat so affecting plants, as to cause disease and decay; but I think it is wrong to attribute all disease to one cause. Our Society has waited long for a premium being claimed for an experimental essay on Canker. Though I do not consider myself warranted to write a regular memoir on the subject, I have not neglected making some observations on this disease; and so far as my observations have gone, I am disposed to think, that the proximate cause of canker is the attack of a minute insect. I have not detected the insect; but the progress of the disease, and its cure, by thoroughly removing the diseased parts, and covering the wound with clay or grease, strongly indicate a local cause. That unfit soil may be a remote cause of canker, as it appears to me to be, is not in the least improbable, as it is well known that the attacks of insects are often made upon substances in peculiar states. Many trees exhibit constitutional affections, as the ash; and both the elm and the oak, but particularly the former, are subject to diseases resembling ulcers. I have also remarked something of the same sort in some fruit-trees; but the appearances to which the name Canker is commonly given, are quite different. There is one kind of canker which attacks

only the extremities of the branches. This, however, is not properly canker. It appears to me to be the result of the young shoots having been imperfectly ripened, and killed by frost, after which fungi and moulds of different kinds attach themselves to the dead wood. This imperfect ripening may be owing to any one of three causes,—the coldness of the climate; the roots having penetrated into bad soil, and debility in the tree from age. Although our gardeners in general are slow in making observations themselves, they will not be slow, I trust, in making such observations as will either verify the conjectures of others, or shew that they are ill founded; and I hope that the hints I have thrown out, will have the effect of your receiving some important remarks on canker.

Much has been written on Hot-house Flues; but heating by Steam appears now to begin to supersede every other method; and we may soon expect to see a very superior apparatus for steam erected in the New Botanic Garden, as Professor Graham, and his assistant Mr Macnab, have lately been actively employed in examining every thing of the kind in England.

The desideratum in the steam apparatus is to reduce the necessity of attendance. This is in a great measure supplied by the use of coke; and probably all that can reasonably be desired may

be obtained, by attention to the construction of the furnace.

There is a communication in the same volume of the London Transactions from Mr Harry Dawes, giving an account of the beneficial effects of covering a wall with thick black paint. It has been supposed by some, that painting walls white is most proper. But it is evident, that light is absorbed only by the front of the leaves; and hence reflecting it on the back is of no use. The purpose of a wall is to collect and to dispense heat; and whoever is acquainted with the discoveries and experiments of Leslie, must be satisfied, that black is the proper colour for a garden wall, and that the more rough the surface of the black matter laid on, the heat will radiate from the wall more freely. Black bricks and tiles are preferable for hot-houses. But from an experiment I have made, I am inclined to think, that the greatest advantage is to be derived from lining walls with deals rough as they come from the saw, and painted of a dark colour.

Various methods of glazing the frames of forcing-houses have been recommended; and that called Circular Glazing appears to be the best. This consists in giving a circular edge to the ends of the panes, so that the condensed vapour is made to run towards the middle of the overlap, where a

very small portion is left without putty, and by which it is suffered to escape. In ordinary glazing, the moisture does not escape, but either drops upon the plants beneath, or soaks into the astragal, destroying the wood, and loosening the putty. I have asked the opinion of a glazier with regard to the expence of this kind of glazing, and he shewed me how the sheets of glass could be cut circularly without waste; and he said that the additional trouble was scarcely worth notice.

The cultivation of the Filbert is very little attended to in Scotland, although it has been ascertained, that, even far to the northward, the climate is not too cold for it. In the 4th volume of the Transactions of the London Horticultural Society, there is a very perspicuous account by the Reverend Mr Williamson, of the mode of management pursued with regard to the filbert in the county of Kent, where large quantities are raised. For plants, it is recommended to take suckers in the autumn, and to place them where they are to remain. The filbert requires much manure, if not planted in a rich soil; and a considerable depth of soil over a dry bottom. Great attention is necessary in pruning the trees. The bearing branches are always those of the preceding year. The slender scarlet filaments which appear in spring, are the productive blossoms; and the catkins are the fructifying blossoms. Hence, in pruning, care

must be taken to leave a sufficient number of the catkin blossoms, which are easily distinguished.

The following is the description given by Mr Hooker, of a new Plum, raised by Mr Wilmot, from which it appears, on account of its late blossoming and early ripening, to be a fruit most desirable for Scotland. No tree of this new variety are yet to be obtained, except from Mr Wilmot himself; and it is fortunate that our Secretary has been able to procure one, from which, in due time, plants may be obtained.

"The original tree was raised by Mr Wilmot in his garden at Isleworth, about ten years since, and in its habit it nearly resembles the old Orleans, but the shoots are shorter from point to point, and the buds more prominent; the leaves are somewhat longer and of a rather deeper green; the flowers expand at a later period than those of most other Plums, notwithstanding its fruit ripens three weeks before that of the Orleans, and as early as the Precoce de Tours, and the Morocco.

"The fruit is above the middle size, round, slightly cleft, the skin all over of a rather dark purplish tint, when well exposed, but the shaded part is of a delicate pale red, covered with a fine blue meal; the external appearance is much like that of the Orleans, but the colour is generally darker, and somewhat brighter, and the form more compressed, especially at the eye; the flesh is of a rich

greenish yellow, inclining to an amber tint, when quite ripe; of pleasant consistence, being much softer and more juicy than the Orleans, of excellent flavour, sweet combined with pleasant acid; the skin is slightly pungent, thin, and peels very readily from the flesh; the stone is round, rather small in proportion to the size of the fruit, and separates clearly from the flesh.

"This variety is particularly adapted for an early supply for the dessert, and is decidedly superior to any Plum of its season, at present cultivated; the lateness of its flowering renders its crop more certain, and the habit of the tree is vigorous and fertile. Its beautiful appearance will obtain it a preference in the market, and it is well adapted for baking.

"The importance of a superior early Plum is too obvious to require comment, and will be an apology, I trust, for my thus troubling you."

I received a letter from Mr Knight, a short time ago, in which he offers for the Society and for myself, a supply of plants of a Strawberry which he raised. It is named the Downton Strawberry, and is figured in the London Transactions. It is a large fruit; and Mr Hooker describes it as exquisitely rich, abounding in juice, and far excelling every other Strawberry he had ever tasted. It is valuable also on another account, that it yields an abundant crop during five or six weeks after it

shews the first ripe fruit. It also preserves its flavour several days after being gathered.

I procured a plant of the Florence Cherry a few years ago, considering, from the description of it, that it would be valuable on account of its being late. The transference to the latitude of my garden in Ross-shire did not lead me to expect that this beautiful fruit would succeed with me. Until last year, the growth of the plant was rather stunted; but it has now thrown out tolerable shoots; last season one cherry grew upon it and came to perfection; and I hope soon to give such an account of it, as will induce every one who has a garden, to place the Florence Cherry in their collection.

Since what precedes was printed, I have received the Second Part of the 4th volume of the London Horticultural Transactions, which contains much curious and important matter.

Mr Knight, in a short paper, recommends an economical mode of using fuel for hot-houses, by mixing up coal-dust with a third of its bulk of clay, and when the mixture is wet, cutting it into square pieces, half the size of a brick. It is put into a large fire-place in this wet state, with a sufficient quantity of brush wood to ignite it. The mixture of coal and clay burns very slowly and steadily.

This kind of mixture is not new, as I have seen it used, but not for hot-houses, a great many years ago; and it is surprising that it has not been before applied to heating houses of all descriptions.

In another paper, Mr Knight explains the effects of ringing the branches of trees by his theory of the motion of the sap; and in a satisfactory manner shews, that the practice is injurious. Ligatures he finds almost as effectual, and less injurious.

There is an account of a mode of raising early Melons, by Mr P. Flanagan, gardener at Stow Hall in Norfolk, which is deserving of attention. The dung-heat is managed by means of a flue in a brick pit; but the description being without a plan, it is not very easily understood. The pit is filled nearly full of rubbish of bricks, &c. and over this is placed a layer of cold dung, and another of rotted dung, which are firmly trodden down. Over the dung is laid coal-ashes quite smooth, almost half an inch thick, for the purpose of preventing any worms getting up from the dung. It is the dung connected with the flue which gives the heat: it does not appear quite distinctly how it is applied; but it seems not to differ much from what has been done in various parts of this country.

The great variety of Melons which we have, seems to have originated in the little attention

that is paid to keep the varieties separate. Sometimes three or four different kinds are raised in the same frame, and insects passing from flower to flower, infallibly impregnate one with another; and from the seeds melons are produced very different from what are expected. I remember saving some seeds of a very fine green-fleshed melon at the table of a friend, and from these sprung melons of various shapes, some with green, and others with red flesh; and on inquiry, I found it was the practice of the friend to whom I allude, to raise as many varieties as possible in each of his frames.

I have just seen an article on Horticulture in the Quarterly Review, in which our Society is treated with some degree of respect. It is blamed, however, on account of having published a memoir of mine, describing an Economical Hot-house, because, as the reviewer is pleased to say, I have proposed to *ripen Peaches in the dark.* A misrepresentation so glaring is, perhaps, scarcely worthy of notice; except on account of my having been accused of writing what was discreditable to the Society. I do not greatly blame the Editor, because it is probable he never looked at the article, in which such an absurdity is attributed to me. The truth is, that so far from proposing to ripen peaches in the dark, so much regard is paid by me to the admission of light, in my account of the economical hot-house, that not a single branch or leaf is ad-

mitted under the glass. I believe that, in a publication by Mr Loudoun, on Spherical Hot-houses, that author, alluding to the memoir in question, states, that I had expressed myself, in a memoir published by the London Society, as if I had been convinced that I was totally wrong in my estimates of what I had called an Economical Hot-house. This is not correct. I said that I had not given the construction of the economical hot-house as the *best*. But although I do not consider it as within many degrees of the best, still I know it, from experience, to be well adapted for raising a greater quantity of fruit (though not, perhaps, of the very first quality) with a given surface of glass, than what is usually produced; and I recommended it to market-gardeners. The reviewer ought to have shewn that he had read the London Transactions, which, as well as our memoirs, he professes to review, by referring to my memoir on hot-houses there, and to what Mr Knight says on the subject; and had he done so, he would have stated, as Mr Loudoun has done, how far I had gone in bringing the form of hot-houses towards perfection, instead of asserting that Mr Knight's papers on light and leaves had been thrown away upon me, and that Dr Duncan *senior* had been unfortunate in bestowing his approbation.

The reviewer proclaims the inferiority of the Scottish memoirs to those of the London Society.

Our object has hitherto been, to encourage exertion on the part of operative gardeners, with the view to preserve the high character which the Scottish gardeners have always upheld, especially in England, in which part of the Empire there are few gardens of any consequence, in which a Scotchman is not to be found. The Caledonian Horticultural Society does not value its publications on account of any thing but their disseminating the practical results of management. The Society recommends nothing, being well aware that a particular practice that succeeds in one garden, may not succeed in another. In one great object, exciting emulation, and a desire for improvement, the Society has succeeded beyond its hopes.

I may conclude this article by announcing, that there is now a near prospect of an Experimental Garden being established at Edinburgh. Several situations have been examined, and more than one of them has been found well adapted to the objects in view.

XVI.

On the Varieties of Melon called the Ionian and the Egyptian.

By James Howison, Esq. Crossburn House.

In a Communication to the Secretary.

(Read 8th March 1821.*)*

In a paper written by Sir George Mackenzie, entitled Horticultural Gleanings, published some time ago in the Memoirs of the Caledonian Horticultural Society; among other remarks, on the management of the Melon, he says, that, "unless the Green-fleshed and Valentia, we have not another Melon worth cultivating." This stricture, until very lately, I considered as perfectly applicable to all the melons known to us, with the exception of the Green-fleshed; the whole of the Cantalopes and Rocks having so much of the cucumber flavour, even when ripe, as to resemble more a variety of that species than a more distant member of the family.

Having seen that a medal had been awarded by the Society in 1818, for a melon, named the Green-

fleshed Ionian, I applied to our Treasurer, Mr Dickson, who, very kindly, gave me a few of its seeds; as also some of another kind, on the envelope of which was written, "Egyptian netted Green-fleshed Melon, and *the best I ever ate.*" From both of these I raised a sufficient number of plants for two frames, of three lights each, and which were planted out in the beginning of May 1819 *. On the 28th July, I cut the first ripe melon from the Ionian, and, in a few days after, one from the Egyptian. Until then, I had considered the old Green-fleshed Melon as a fine flavoured fruit, but, when compared with the above, it appeared to me as much inferior to them as the White-fleshed melons are to it.

Their external appearance distinguish them from all melons formerly known to me; but to do this more clearly, I think the first might very properly be named, The lemon-coloured and lemon-shaped green-fleshed Ionian Melon; and the second, The round netted green-fleshed Egyptian Melon. The Ionian grows to three times the size of the old Green-fleshed Melon; and the Egyptian,

* Having observed that most of the melons which arrive at perfection, are found on the runners near to the main stem, and my sashes being 7 feet long, I set one plant 2 feet from the bottom, and another 2 feet from the top, which leaves 3 feet below the plants; and in this way I get a greater quantity of fruit than when one plant is placed in the centre of each light, as generally recommended.

although not so large, is still a good sized fruit. The skins of both are so thin as nearly to resemble that of a turnip, owing to which, the eatable part is much greater than that of any other melon of the same magnitude; and although neither are great bearers, they continue giving fruit for a long time.

I must, however, mention a defect, to which they are both liable, that, although the fruit appear perfectly ripe and high-flavoured, a dozen of seeds properly matured may not be found in as many melons. This may render it necessary to procure these from a warmer climate, an expence which I am sure no person will grudge who has ever tasted these delicious fruits.

I think it probable, when the superior qualities of the Ionian and Egyptian melons are better known, this species of fruit will be more generally esteemed. Melons, of all fruits forming a dessert, are incomparably the quickest of growth, four months only intervening from the sowing of the seed until fit for use. Near large towns, where horse-dung can always be procured, the expence of raising them is trifling; and the beds, in the way mine are constructed, might be placed in the centre of flower-plots, where they would rather be ornamental than otherwise. The pits are dug 4 feet deep, and have a lining of brick and mortar, the thickness of a brick length all round. This lining rises above the level of the pit 1 foot in front, and 2

feet at the back, the sides having a corresponding slope. The wooden-frames or boxes on which the sash-frames rest, are made of inch deal; and, for more easy removal, can be taken to pieces, being joined at the corners with nuts and screws*. These sash-frames, when joined to the wooden boxes, are 1 foot deep in front, and 2 feet at the back, and are wide enough for three lights, which fill the pit from *side* to *side*, but in *front* and *back* are so much shorter, as to leave intervals of a foot and a-half to admit of lining. In this way, from the frames almost touching the walls, the dung is completely concealed on two sides; and, to effect the same at top and bottom, I have sloping boards which run along the front and back, their upper sides resting against the frame, and their under on the front and back walls. These are built sloping a little outwards, by which the rain water from the glasses is carried clear off the pits. When the boards are painted uniformly with the frames, the whole has a very neat appearance.

At the time the dung is thrown into the pits, care is taken that they are filled up level with the top of the walls. The earth is then added, as also the frames and sashes, which soon bring every thing to its proper bearing; and to prevent their sinking too deep in the dung, thin slips of board are placed under them. By this construction, the

* The frames above mentioned are nothing more than square boxes without bottoms, to raise the frames, in which the sashes

glass is ever equidistant from the soil, the frames following it down in proportion as the dung subsides, which I find to be of great consequence, and which cannot be accomplished when the frames are connected with the mason-work. I may now remark, that I have for some years past used for my melon-beds loamy earth from a pasture, without any *addition* whatever, and which has answered much better than compost, made according to Mr Nicol's directions. When the latter was made use of, the vines grew too luxuriantly; and the fruit, although larger, were neither so numerous or high flavoured.

As horse-dung cannot always be procured in the country in sufficient quantity, I was induced to make trial of equal proportions of that and *cow-dung*, which I now much prefer to the former by itself. From the moist nature of the cow-dung, the heat is so modified as to require no fermenting or turning over, previous to the heap being thrown into the pit; and the exhalations so far from being hurtful to the plants when thus mixed, appear highly salutary, and render watering almost unnecessary *.

run to a proper distance from the soil. They are joined to one another, by pins fixed in the upper frames, going into holes bored in the lower, and are much more manageable than if in one piece.

* When cow-dung cannot be obtained, it is probable peat might be substituted, being, like the former, retentive of moisture, and capable of fermentation.

From my experience, water should be much more sparingly used in the cultivation of the melon than has been generally recommended, especially with the Ionian and Egyptian, both the vines and fruit of which being very easily hurt by too much moisture. In some trials I made to raise melons with fire-heat, I was in no degree so successful as with the dung. Instead of the regular and moist heat, so favourable to vegetation, which is produced by the latter, that from the former, after every attention, was at times either too high or too low, and the plants under its influence seldom brought their fruit to perfection.

So many facts appear against the necessity of a free circulation of air for obtaining fruit of a proper flavour, when raised under glass; and these accord so much with my own observation, that weeks sometimes pass without moving a sash of the melon frames, when the heat of the sun is not great. To gain that object, I consider *a proper degree* of heat and light as of much more consequence, and without which neither grapes, pine-apples nor melons, can be brought to perfection; but where these are present, they can be produced of a higher flavour in this country than I ever found them possess in their native climates, where, growing in the open fields, abundance of fresh air could not have been wanting. Peaches raised under glass are offered as the strongest proof against this doctrine; but their want of flavour may be

owing to *any degree* of forcing being too much for this plant*. The largest apples and pears I ever met with was at St Helena, but in flavour they were not superior to a turnip; a proof that the heat and light of that climate are too much for these fruits. A few degrees of latitude includes all that tract of country, either in Europe or America, which is famous for producing apples and pears in perfection, and gooseberries and strawberries have perhaps as high a flavour in Scotland, as in any other part of the world. We may therefore reasonably conclude, that this is in a greater measure owing to the quantity of light and heat in these situations, being *exactly suited* to the nature of these plants, than to any difference in the quality of the air, which is much the same in every part of the globe.

Crossburn House, Douglas,
February 26. 1821.

* How necessary it is that the degree of heat and light should, as exactly as possible, correspond with the nature of the plant, to produce fruit in perfection, is well exemplified in the Moor-fowl egg Pear, and Mayduke Cherry. In Scotland, a wall is too much for the former, and the open ground too little for the latter; but only exchange situations, and both will produce fruit in great perfection.

XVII.

On the Cultivation of the Potato Onion.

In a communication from the Rev. J. M. Robertson, Minister of Livingstone, to G. Bell, Esq. Edinburgh.

Dear Sir,

When I had the pleasure of meeting with you at Blackburn House, I promised to send you a few potato-onion roots, which you considered to be a curious variety of that vegetable. In begging your acceptance of them, I comply with your desire, in giving you all I know of their history, and mode of culture.

I have some reason to believe, that they are common in the neighbourhood of Petersburgh; and this belief arises from a young gentleman's expressing his surprise to his parents on his return from a voyage, at having seen onions which grew in clusters upon the ground, at that place.

These onions must be planted upon rich ground, 6 inches separate in the drill, and 10 between the rows, for the convenience of hoeing. They must not be covered with the soil, but the bottom of the stem left uncovered. When they begin to vegetate, they shew the number of onions which each

root will produce, from the appearance of the incipient shoots. Very small roots only increase in size the first season they are planted out, but become surely prolific the next. Those (such as I have sent you) will produce from two to twelve onions and upwards. I last year had two plants, one of which produced seventeen on the ground, and five on a stalk, like the Canadian tree-onion. The other produced nine at the root, and four at the top; the top ones are very small, but may be proper for planting; but of this I have no experience. They are full grown by the end of July, and are ripe when the blades begin to decay.

The proper time for planting them is either in autumn or spring. I have them at present shooting up; and to-day, 2d November, I am planting my whole crop. Last year I planted some in October, some in February, and some in March; and all did equally well.

I have been told, and I think it true from my own experience, that there are two varieties of them; the largest begins to vegetate as soon as ripe, and consequently does not keep well; the other keeps as well as the common onion.

When dressed, they cannot be distinguished in flavour from the Strasburg onion; and if they should not be so easily preserved through the winter, they have the property of being in abundance in the summer, when no other onions are fully grown.

It may please you to learn, that I have succeeded far beyond my expectation, by transplanting common onions in March, which were sown in August. They increased to a very large size, and have dried and kept well.

I have, by way of experiment, this season, sown the Leek in August; and am very sanguine in my expectations, that, by transplanting them in March, they will be as much improved as the onion is by the same process. If I succeed in this object, I shall have pleasure in giving you information of it; at same time, I shall be able to tell you of the fate of the small potato onions which grew at the top of the stalks. I am, &c.

LIVINGSTONE MANSE,
Nov. 2. 1820.

XVIII.

Notice of Mr Knight's doctrines regarding Fruit-Trees, with an account of some of the processes followed in raising New Seedling Varieties.

By the Secretary.

DURING the last twenty years, great attention has been paid to the production of New Seedling Varieties of the more hardy fruits suited to the climate of Britain. For exciting the attention of the public to this important matter, we are peculiarly indebted to Mr Knight of Downton in Herefordshire, President of the London Horticultural Society. In his *Treatise on the Apple and Pear*, that gentleman noticed in a particular manner the fact, that some of the finest Cider and Perry fruits of the seventeenth century have already become extinct. This was undeniable; and daily experience shewed, that the Golden Pippin in England, the Grey Leadington and Winter Strawberry in Scotland, and other old apples, were fast wearing out. Mr Knight remarked, that each variety of

fruit springs from an individual at first; and that, by means of grafting or of budding, the individual alone has been extended. Whatever tendency to decay and extinction existed in the individual at first, must, he observed, exist in all the extensions of that individual, accomplished by means of buds or of grafts. By careful management or by fortunate situation, the health and life of a particular individual or original tree may be prolonged; and, in like manner, some buds or grafts, placed on vigorous stocks, and nursed in favourable situations, may long survive other buds or grafts from the same tree, or may long survive the original unengrafted tree. Still, in all of them, there is a progress to extinction; and the only renewal of an individual, the only true reproduction, is by seed.

Mr Knight's doctrine, we may add, seems now to be established as far as regards Fruit-trees. It may probably be extended to all Trees, and even to all the more perfect tribes of plants; for Philip Miller long ago observed, that herbaceous plants propagated by *cuttings*, became barren in a few years. The importance of acquiring new varieties of our staple fruits from the seed, is now, therefore, universally acknowledged; and as a taste for experimenting in this way is prevalent, it has been suggested, that we might do an acceptable service to many of our readers, by laying before them an account of some of the precautions adopted by the distinguished horticulturist already mentioned, and

of the facilities which have been devised towards success in this interesting branch of gardening.

The seeds to be sown should belong to the finest kinds of fruit, and should be taken from the ripest, largest, and best flavoured specimens of each kind; for although some very indifferent fruits resembling crab-apples may result from sowing the seeds of the Nonpareil, the Balgone, or the Newtown Pippin, yet, from the seeds of such excellent varieties, there is a greater chance of procuring an apple somewhat similar in good qualities. Mr Knight took uncommon pains in order to procure promising seeds: for example, he prepared stocks of the best kinds of apple, capable of being propagated by cuttings, and planted these stocks against a wall in a rich soil; these were next year grafted with cions from the Golden Pippin. In the course of the following winter, the young trees were raised from the ground, and the roots being shortened, they were replanted in the same spot. By this mode of treatment, the tendency to the production of wood being abridged, the plants were brought into a bearing state at the end of two seasons. Only two apples were suffered to remain on each little tree; the fruit consequently attained a large size and perfect maturity. The seeds of the apples thus procured were sown, in the hopes of procuring seedlings possessed of qualities allied to those of the Golden Pippin; and if these hopes have not

yet been fully realised, the success has been sufficient, at least, to encourage to perseverance in similar modes of experimenting.

It may here be mentioned further, that, with the view of producing a variety uniting the good properties of two known and highly approved kinds, Mr Knight in England, and Mr Macdonald of Dalkeith in this country, have been at the pains to bring the pollen of the one kind in contact with the pistils of the other. To do this with proper effect, requires considerable nicety and caution. Mr Knight opened the unexpanded but nearly full grown blossom of the variety destined to be the female parent of the expected progeny, and, with a pair of small-pointed scissors, cut away all the stamina or males, while the anthers were yet unripe, taking great care to leave the style and stigmata, or female parts in the centre of the blossom, uninjured. The blossoms were then carefully closed, and left till they opened of themselves. When this spontaneous opening took place, the full blown blossoms of the other variety were applied, or a portion of ripe pollen from these blossoms was deposited on the stigmata of the prepared blossoms. It is proper to cover the branches on which the prepared blossoms are situated, with gauze or thin muslin, so secured as not to injure the blossoms, nor to exclude sun or air, but effectually to prevent the access of bees or flies, which

might communicate the pollen of other blossoms, and mar the experiment.

It is evident, that both of the trees from which the new kind is to be raised, must be in blossom at the same period of time. If one, therefore, should be an earlier sort than the other, it may be retarded by shading; while means may be devised for somewhat forwarding the other. In order to give additional vigour to the blossoms subjected to experiment, it is proper to remove all other blossoms from the same branch.

Not only have the fruits resulting from such artificial impregnation been found of the most promising character, but the seeds of these fruits, again, have been sown, with the expectation of procuring improved varieties, and there is every reason to think that the expectation will be fully realised.

Mr Knight has often remarked in the progeny, a strong prevalence of the constitution and habits of the female parent: in this country, therefore, in experimenting on pears, the pollen of the more delicate French kinds, as the Crasanne, Colmar, or Chaumontelle, should be dusted upon the flowers (always deprived of stamina) of the Muirfowl Egg, the Grey Achan, the Green Yair, or others that are hardy or of British origin.

It may here be remarked, that late blossoming, early ripening and general hardness, are the qualities most desirable in fruit-trees, in the climate of Scotland—where Winter so commonly "lin-

gers in the lap of May,"—where the summer is consequently of very short duration, and where the weather is at all times extremely variable. Proceeding as usual upon philosophical principles, Mr Knight has pointed out a mode by which new seedling varieties possessed of the desirable properties now mentioned, may in all probability be obtained.

This philosophic horticulturist founds very much on a general remark, the truth of which is well known to every gardener, and to every observer of nature, that in the spring, "a great degree of heat suddenly operates on plants which have been exposed to intense cold, in which the excitability has been augmenting during a long period of almost total inaction; and the progress of vegetation at that season is consequently extremely rapid." With this principle in view, Mr Knight operated on some fruit-trees, which occupied a wall in his garden having a south aspect. In order to render them more inactive during winter, and thus promote the accumulation of their excitability, he unnailed the branches in the end of autumn, and removed them as far as possible from the wall, securing them by stakes in this exposed situation, for several months. In the spring, when the blossom-buds were swelling, the branches were again trained close to the wall; thus sheltered and brought at once into a warmer climate by the reflection of the wall, the effects of accumulated excitability were apparent:

the flowers were speedily unfolded; and these being vigorous and healthy, produced fruit which attained perfect maturity at a period evidently earlier than usual. The seeds of these fruits, again, were sown; and the resulting seedling trees were found to partake of the quality thus artificially communicated to the parent trees; for when they attained to a bearing state, they were found to ripen their fruit considerably more early than other trees raised at the same time from seeds of the same varieties of fruit which had not been retarded, or in which an increase of excitability had not been effected by artificial means.

By due attention to all these ingenious measures, it may be hoped, that, in the course of another generation, excellent *Winter* Pears may be obtained in abundance from our standard trees; for at present we are nearly destitute of hardy winter pears. We may perhaps also anticipate for our successors the enjoyment of new varieties of Peaches, Nectarines, Figs and Mulberries, much better suited to the climate of Scotland than any which we possess.

Some persons make a practice of sowing great numbers of apple or pear seeds, gathered indiscriminately. Out of some hundreds of such seedlings, a very few only may prove deserving of any notice. In the ordinary course of nature, the lapse of six, or perhaps ten years, would be required, before the fruit could be seen. But in order to form

a general estimate of the character of the seedling trees, it is not necessary to wait till they actually produce fruit: even in the first season, such an opinion may, to some extent, be formed, from the shape and texture of the leaves; those which are pointed, thin and smooth, promising little; while those which are blunt or round, thick, and inclined to be downy, promise well. In the second year, these tests are more satisfactory; for the leaves of good kinds improve in the above noticed qualities yearly. Plants, whose buds in the new wood are full and prominent, are much to be preferred to those whose buds are small and almost sunk in the bark.

Some means have likewise been devised for hastening the production of the fruit of seedling trees, or shortening the period of probation. The moving of the plants, and shortening of their roots, have already been mentioned. Mr Williams of Pitmaston, an eminent English horticulturist, has succeeded in promoting their early puberty, by using means to hasten that peculiar organization of the leaf which appears necessary to the formation of blossom-buds. The seeds (of course only of select kinds) are sown in pots, and the growth of the seedling plants is forwarded by the artificial heat of a peach-house or vinery. They are afterwards planted out in nursery lines. Every winter, all the small lateral shoots are removed, leaving the stronger laterals at full length; and

such a general disposition of the branches is effected, that the leaves of the upper shoots do not shade those below. Every leaf, by its full exposure to light, is thus rendered an efficient organ, and much sooner becomes capable of forming its first blossom-buds. Those who have even slightly studied vegetable physiology, must be convinced of the great importance of attending to such apparently minute circumstances.

Another plan resorted to with success, consists in taking buds from the seedling trees, and inserting them on wall-trees which have arrived at maturity: in this way, the fruit may be seen at least a year sooner than otherwise. This practice is to be recommended, further, because it multiplies the chances of obtaining fruit as soon as ever the seedling-tree attains the age of puberty; the wall being very useful, in our variable climate, in protecting the first blossoms.

Mr Knight finds that a warm sandy soil and a good climate, are capable to a considerable extent of accelerating the age of puberty in seedling fruit-trees; and he is satisfied that considerable advantages may, in the same point of view, be derived from the aid of hot-houses, during the first and second year of the seedling's life, and probably, by buds and grafts upon low stocks, to a later period.

It may be remarked, that if the fruit, when it does appear, possesses any promising qualities, such

as fine colour, firmness, juiciness or flavour, it ought not to be rejected at first on account of acidity or smallness of size: If a seedling fruit be juicy, it is very promising, for this good quality not only increases with its years, but the juice generally becomes more mellow; and it is remarked, that a fruit having a firm pulp commonly improves with the age of the tree, but that a fruit having a soft or mealy pulp gets worse. In general it may be observed, that the fruit has always a tendency to improve in mellowness and in size, as the tree itself becomes stronger and approaches maturity.

XIX.

On the Culture of the Auricula and Polyanthus, with a plan of the Delvine Auricula Frame.

By Mr William Henderson, at Delvine.

(Read 26th April 1821.)

In compliance with the Society's prize schedule, I give an account of my mode of cultivating the Auricula and Polyanthus, and send for exhibition specimens of each of these flowers *, from the collection in the garden of Sir Alexander Muir Mackenzie, Bart.

I shall first state the compost I employ for Auriculas. About the end of November, I take two measures of very rotten dung from old hot-beds, one measure of vegetable mould, and one-fourth measure of river sand, and mix the whole in an open situation, so that the heap may be fully exposed during

* These specimens were exceedingly strong and beautiful, and bore ample testimony to the excellence of Mr Henderson's mode of culture.—Ed.

winter. In spring the compost is turned over, well broken, and then sifted with the finer garden sieve, the meshes of which are $\frac{3}{8}$ths of an inch. The siftings are again passed through the wider garden sieve, the meshes of which are $\frac{4}{8}$ths of an inch; and what now passes is kept in a dry place till the shifting season, when a handful of these riddlings is put into the bottom of each pot as a drain.

The shifting season is always, with me, about the third week of May, when the plants have done flowering. At that season, I shake the mould from the old plants, and cut the end of the stump up to the fresh young roots, if it has grown two long. (I am now speaking of those plants which have been in the largest sized pots for two years). After dressing the wounds with gum-mastick to prevent gangrene, the plants are re-potted in the second size of pots. Next May they are shifted, with the ball entire, into the largest size, or flowering pots. So that, from the first potting of the young plants in small pots, to a complete shifting, four years elapse; the plants having been one year in small pots, one in the second size, and two in the largest or third size. A little river sand is put round the stems at all the shiftings; and if any wounds are made by taking off the suckers, they are dressed with mastick. At all times the stems are cleared of sprouts above

ground as they appear, but suckers from under are allowed to grow, in order to form young plants.

When the shifting and top dressing are over, the plants are set out upon bricks or boards; if on the former, I make a bed of sand under the bricks; if on the latter, they are raised above the ground, so as to prevent worms getting into the pots. If worms get in, they soon change the quality of the soil, and of course injure the plants. The pernicious effect that the common earth-worm has in all flower-pots, in impeding the free circulation of the water, is obvious; but the auricula sooner feels their effect than any other plant. I have made trial of various other plans for destroying the worms without hurting the plants: the most efficacious of which, I take this opportunity to lay before the Society. Before the plants are placed in their winter quarters in October, I take as much walnut-bark as half fills a common watering-pot: I then fill up the watering-pot with hot water; and next day, when the decoction is cold, I give all the infected auricula pots a watering with it, always making choice of moist weather for this operation, and avoiding the leaves of the plant. If the decoction is not over strong, the worms will immediately throw themselves out of the earth and pots, but if strong it will kill them in the earth. One potful of the decoction is sufficient to go over eighty or more auricula pots.

The application is generally succeeded by a marked renovation of health in the plants.

I give the auriculas little or no water from October until the second week of February. I then top-dress the pots with the compost; and water with the rose, when the weather is fresh and favourable, until the flowers begin to expand, covering the frame at night, so as to prevent frost getting at the plants, but giving all the air possible in the day time. In summer I water with dung-hil drainings, or water wherein cow-dung has been put, which forms a paste on the top of the soil, under which the roots shoot out freely. After such waterings, I give a little fresh water with the rose, to wash off any dung-water that may have fallen on the plants.

I have been successful in raising a few good seedlings by the following mode. I select a few *young* plants of sorts proper for the purpose; that is, such as have a well formed small eye or pip, as that prevents the petals from turning backwards, which in an auricula is a great defect; and such as, when at full growth, produce a regular formed truss. Just when the flowers are beginning to expand, I set them in an open but sheltered place of the garden, covering at night for some time. In such a situation they perfect their seeds; while in a frame or covered stage they do not. The seeds are sown in Fe-

Hort. Mem. Vol. III. page. 233.

Fig. 1.

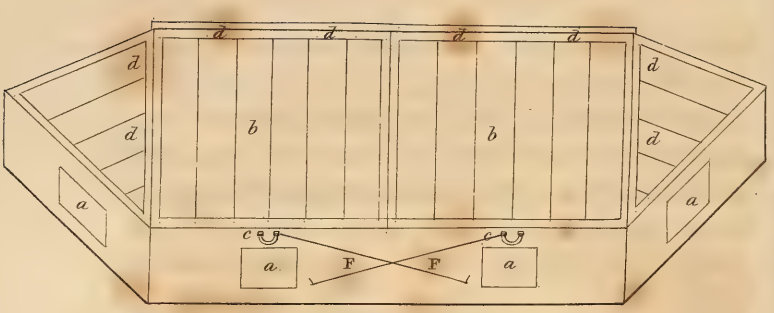
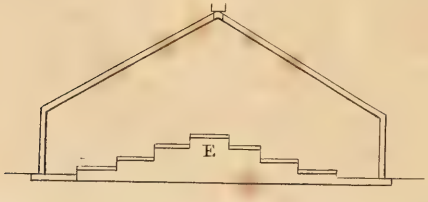


Fig. 2.

Fig. 3.



Scale of Feet.

bruary, under glass. The plants produce a partial blow the third year.

The compost for the Polyanthus is as follows: one measure good loam; one measure vegetable mould; and one measure rotten dung. When the flowering season is over, the plants are turned out of the pots, with the balls entire, and planted in a place shaded from the sun. The second week of June they are taken up, and the plants divided: the strong are re-potted for flowering next season; the others are put under hand-glasses to strike, and may be potted by August for flowering. I observe the same mode in seeding the polyanthus as in the auricula: the plants flower strongly the second season from the seed.

My auricula frame answers all the purposes of frame, hand-glass, and stage, used by the English florists, at least to make it do so, I have only to erect a screen of matting on poles in front, during the flowering season. A sketch or plan of the frame is annexed.

DELVINE GARDEN,
24th April 1821.

Explanation of Plate IV.

Fig. 1. PROFILE.—*a*, *a*, *a*, *a*, Ventilators. *b*, *b*, The two Front Sashes, lifted by handles *c*, *c*; and having hinges at *d*, *d*. F F, two iron rods for holding up the Sashes.

Fig. 2. GROUND PLAN.—*e*, *e*, *e*, *e*, Blocks of wood, with two screw bolts in each.

Fig. 3. SECTION.—Shewing the stage E, which holds 130 flower-pots.

XX.

Hints as to the best means of procuring Useful and Ornamental Plants from the North of India, and preserving Seeds in their passage through the Tropical Climates.

In a Letter from JAMES HOWISON, Esq. of Crossburn House, to the Secretary.

(Read 10th March 1818.)

SIR,

HAVING seen, from the proceedings of our Society at their last meeting, that Dr White, of the Medical Board, Bombay, had been elected an Honorary Member, it occurred to me that, through the assistance of the three Medical Boards in India *, seeds and roots of most of the useful plants of our newly acquired provinces in that quarter might be obtained.

It is an invariable practice with our Government in India, to cause all embassies and residen-

* In India there are three Medical Boards, one for Bengal, one for Madras, and the other for Bombay.

cies to be accompanied with medical attendants; and those gentlemen possessing knowledge in natural history are generally selected for such services. As they are under the direction of their different Boards, they would be ready in executing any orders they might receive from them.

I know that Dr White of the Bombay, and Drs Cochrane and Ogilvie of the Bengal Board, were pupils of our worthy First Vice-President Dr Duncan, and they would be happy, as far as in their power, to comply with every request of his.

As I should suppose it to be a primary object with the Society to obtain seeds and roots of plants, the habits of which would at once be congenial to this climate, without the trouble of naturalization, we must look for these from the dependencies of Bengal and Bombay, in the North of India, and not to those of Madras, the vegetable productions of which must ever require artificial heat.

In Bengal our present connections with the Rajah of Nepaul, will enable the medical gentlemen attending the Resident at his Court, to collect seeds of plants, natives of the snowy mountains of that country, and of the more temperate districts bordering upon it.

At Bombay, from the constant intercourse they have by sea with the kingdom of Persia, as also with its own extensive dependencies, full scope

will be given to the knowledge and industry of Dr White.

I shall here take the liberty of inserting an extract from a letter I very lately wrote that gentleman, as to what I would recommend to him as the objects of his research, in making a small collection for me, and of sending the seeds home in a state fit for vegetating.

" To Dr White, Medical Board, Bombay.

" From the influence you must have with the Medical Gentlemen of the residencies under your Government, I wish you would employ it in procuring for me a few seeds of the highest flavoured and earliest grapes, and musk-melons, from Surat and Persia. Here, I raise a quantity of musk melons annually, which I prefer to every other fruit that grows ; still it is possible that, in these places, they may have both grapes and melons higher flavoured and earlier than any we yet possess. Melons have this advantage over most fruits, that a few months after sowing, their value is completely ascertained.

" The seeds of all beautiful flowering shrubs and flowers, which blossom during the cold season at Surat, or at a low temperature any where else, would be highly acceptable. Send also the different kinds of wheat, peas, onions, or any other

kitchen root or herb which you suppose might grow here in the open air.

"While I resided in Bengal and at Prince of Wales' Island, I saw many roots and herbs, which would have made a valuable addition to our list of culinary vegetables; but the improbability of raising them without artificial heat, did away every wish to introduce them into this country. You should therefore always have it in view, when making your collections, that unless the plants are in perfection during the coldest season of the year, they are not likely ever to be generally useful in Great Britain.

"The productions of the north of Persia, and the territories of Nepaul, will form an exception to this rule, as it is more than probable that the greater proportion of these would prosper in this climate. Much attention should therefore be paid to all roots and herbs used as food by the natives of these countries.

"As a candidate for the Gold Medal of the Society of Arts of London, offered for an improved method of bringing seeds from distant countries in a vegetating state, I, when last in Bengal, wrought a variety of seeds into a thick mucilage of gum-arabic, in the same way that carraway seeds are wrought into dough in making gingerbread. These I afterwards divided into small cakes, which I placed in the sun, until perfectly dry; but as a number

of the seeds still appeared on their surface, I dipped the cakes in a thin solution of gum, until the whole were completely covered. On looking into a trunk, twelve years after my return to this country, I found a cake containing babul or gum-arabic tree-seeds, which, having separated, by dissolving the cake in water, I sowed on a hot-bed, when a proportion of three out of four seeds became healthy plants. Were you to follow this plan, there would remain little doubt of the seeds you send us growing.

"While I was in India, none of the methods then in use were effectual for bringing out garden seeds from England in a sound state, even although enclosed in varnished cases and sealed bottles. It appeared to me, that the air which occupied the spaces between the seeds contained a sufficient quantity of water in solution to produce, during the ship's passage through the warm latitudes, a musty fermentation, which inevitably destroys the living principle in seeds. It was from this view of the subject, that I was led totally to exclude air, by giving to each seed its own envelope."

The Society will observe, that I have not included China in the countries mentioned for extending our collections of vegetable productions, from supposing that the almost total exclusion of strangers from its interior, would prove an insur-

mountable bar to our success in that quarter. Had it been otherwise, China, from the great extent of territory occupying the temperate zone, joined to the knowledge its inhabitants possess in gardening, would have opened a wider field than all the other parts of the globe.

It has, however, lately occurred to me, that, by the following management, the above obstacles might in some measure be removed.

From specimens in my possession, I know that drawings of most of the fruit and flowers in China, finished in the most perfect resemblance to nature, can be purchased at Canton. Were I therefore on the spot, I would, in the first place, provide myself with a complete set of such drawings; and as it is not probable that the real fruit and flowers of the northern provinces (which are what we should chiefly interest ourselves with) could be procured in a fresh state so far to the southward as Canton, so as to enable me to judge of their qualities, I would endeavour to procure an intelligent Chinese gardener, who had practised for some time at Pekin, where, from its northern situation, and being the capital of the Empire, the best collection of fruit and flowers suited to our climate, is likely to be found. I would then select the drawings of fruit unknown in Europe, which, on being shown to the gardener and recognised by him, I should, from his description as to size, flavour, early and plentiful

bearing, climate, soil, &c., soon judge if deserving of being transferred to this country. With flowers and other vegetables, I would follow the same rule, accompanying the seeds of each with the description given by him. During the three last years I resided at Prince of Wales' Island, we were annually visited by a junk from Amoy, a Chinese port, which brought a variety of dried fruits, of kinds perfectly new to me. That they were the produce of a temperate climate, is more than probable, from this circumstance, that the fruits of hot countries seldom possess firmness of texture sufficient to admit of being dried. Their succulency, when acted upon by the great heat, immediately brings on fermentation, which can only be prevented by preparations with sugar or ardent spirits.

The ready intercourse that subsists betwixt the different cities in China, would, in my opinion, render it equally easy for a resident of Canton to procure seeds from Pekin, as one in Edinburgh from London. The ascertaining the botanical characters of the plants, should be considered a business to be afterwards accomplished here, and not to interfere with the first collection.

CROSSBURN HOUSE,
DOUGLAS,
14*th February* 1818.

*** Dr Howison's judicious suggestions would immediately have been acted upon by the Council of the Caledonian Horticultural Society, had not various obstacles hitherto presented themselves to the establishment of an Experimental Garden, in connection with the Society;—a supplementary institution which seems indispensable towards the successful prosecution of the views contained in the Doctor's letter.—Ed.

XXI.

List of the Species and Varieties of Iris sent in flower to the Edinburgh Horticultural Society, during the season of 1821, *from the garden of David Falconar, Esq. of Carlowrie.*

By Alexander Forrester, Gardener.

(Read 6th December 1821.*)*

To prevent ambiguity to the botanical cultivator, I have, in the following list, given the specific characters, and also mentioned the authorities for the nomenclature. The notices regarding the mode of culture and means of propagation, are founded on my own experience.

I. *Corollas having beards.*

1. Iris *pumila purpurea.* — Stalk 1-flowered, shorter than the smooth, sword-shaped leaves; tube protruded; petals oblong-obtuse.—Bot. Mag. vol. i.

Purple Dwarf Iris.—This is a common and hardy iris; requires to be planted in a light soil,

and placed in a situation where it will get plenty of sun. It is propagated by parting the roots, and also from seed. The flowers will be considerably improved, if the roots are frequently divided.

2. I. *pumila*, var. *violacea*.—Bot. Mag. vol. xxxi.

Violet-coloured dwarf Iris.—This is amongst the scarcest, as well as the most tender of all the varieties of this species, and it is absolutely necessary to keep it in a frame. It seems to thrive well in a mixture of bog-earth and sand, and is propagated in the same way as the preceding one.

3. I. *cristata*.—Beard crested; stalk nearly 1-flowered, of the same length with the leaves. Germens 3-cornered. Petals nearly equal.—Willd. Sp. Plant. i. p. 225.—Bot. Mag. vol. xii.

The roots of it when chewed, have a remarkable effect upon the palate. At first they occasion a sweet taste, and in a few moments produce a burning sensation, by far more pungent than capsicum. Notwithstanding these properties, the hunters of Virginia use it to alleviate their thirst.

I find that this plant grows best in bog or peat earth: it will grow in any common soil, but seldom flowers in that situation. It propagates freely by its creeping roots.

4. I. *variegata.*—Leaves sword-shaped, smooth, equalling the many-flowered stalk.—Bot. Mag. vol. i.

Variegated Iris.—Grows in any common garden soil. It is propagated by separating its roots.

5. I. *variegata,* var. *minima.*

Small variegated Iris.—Requires the same treatment as the preceding.

6. I. *Florentina.*—Leaves sword-shaped, smooth, shorter than the nearly 2-flowered stalk.—Bot. Mag. vol. xviii.

Florentine Iris.—This species is very prolific in flowers; and being extremely fragrant, the roots are used as a perfume for mixing with hair-powder: these circumstances give this iris a high character. It grows in any common soil, and is propagated by dividing the roots.

7. I. *Germanica.*—Leaves sword-shaped, smooth, falcate, shorter than the many-flowered stalk; tube longer than the germen.—Bot. Mag. 670.

German Iris.—Treated in the same manner as the preceding one.

8. I. *Sambucina.*—Leaves sword-shaped, smooth, erect, shorter than the many-flowered stalk; seg-

ments of the corolla, bent downwards, flat.—Bot. Mag. vol. vi.

Elder-scented Iris.—Resembles very much I. *Germanica*, but the deflected petals are of a deeper violet colour, flat, but somewhat notched; the erect petals pale, but of a deeper blue, and notched. Stigmas serrated, somewhat acute, with a bluish keel. This species will accommodate itself to any common soil, and is propagated by parting its roots.

9. I. *squalens.*—Leaves sword-shaped, smooth, erect, shorter than the many-flowered stalk. Segments of the corolla deflected, turned back; erect petals notched.—Bot. Mag. 787.

Brown-flowered Iris.—This is considered a variety of I. *Sambucina.* It requires the same treatment as the preceding one.

10. I. *pallida.*—Leaves sword-shaped, smooth, falcate, shorter than the many-flowered stalk; tube of the same length with the germen.—Bot. Mag. 685.

Pale Turkey Iris.—This species seems to thrive best in a rich loamy soil, and also requires to be placed in a southern exposure.

11. I. *aphylla*, var. *Swertii.*—Flower-stalks higher

than the leaves, spathes scarious. Corolla pa-lish, waved, wrinkled.

Swertius' smooth-stalked Iris.—Requires a rich soil, mixed with sand, and is propagated by dividing the roots.

12. I. *aphylla*, var. *plicata.*—The whole plant taller in its flowers, more odoriferous, and more coloured, than the preceding.

Folded Iris.—Same soil and propagation as the one above.

13. I. *furcata.*—Leaves sword-shaped, shorter than the forked, 2-flowered stalk. Germen 3-sided, 3-furrowed.—Marschall à Biberstein, *Flor. Caucas.*

This beautiful dwarf Iris flowers very early in spring, and requires bog or peat earth, with a good exposure. It was raised from seed in this garden.

14. I. *sordida.*—Stalk many-flowered, taller than the leaves; segments of the corolla flat, emarginated. Germen 6-furrowed.—Willd. *Enum.*

Sordid Iris.—Thrives well in a mixture of rich loam and sand. It requires to be planted in a good situation, and is propagated by slips.

II. *Corollas having no beards.*

15. *Ruthenica*, var. β.—Leaves linear, longer than the 1-flowered stalk; alternate segments of the corolla smaller; corolla varying from blue to white, extremely fragrant, with the scent of violets, and large in proportion to the size of the plant.—Bot. Mag. vol. xxxiv.

Pigmy Iris.—It would certainly be of advantage to keep this species in a frame, in order to prevent the attacks of the slug. In the beginning of spring this vermin bereaves it entirely of foliage, destroys its growth, and completely prevents it from flowering in its injured state. It requires bog or peat earth, mixed with sand.

16. I. *spuria*, var. *minor*. *Small spurious Iris.*
17. ——— —— *minima*. *Smallest.*
18. ——— —— *stenogyna*. *Cream-coloured.*
19. ——— —— *desertorum*. *Sweet-scented.*

All the above mentioned varieties of spuria require a light soil, and are propagated by slips or offsets, and by seed.

20. I. *Ochroleuca.*—Leaves sword-shaped; stalk rounded. Germen hexangular. — Bot. Mag. 61.

Pale yellow-flowered Iris.—Thrives best in a

rich, loamy soil. It is propagated by dividing the roots, and by seed.

21. I. *Sibirica.* — Leaves linear; stalk nearly 3-flowered, round. Germen triangular.—Bot. Mag. 50.—*Siberian Iris.*

22. I. *Sibirica*, var. 1.

23. ——— var. 2.

24. ——— *floribus albis.*

All the varieties of Siberian Iris require a rich soil, and are propagated by separating the roots, and by seed.

25. I. *graminea.* — Leaves linear; flower-stalk 2-angular, nearly 2-flowered. Germens hexangular.—Bot. Mag. vol. xviii.

Grass-leaved Iris.—The flowers have a scent somewhat resembling that of fresh plums. This species thrives best in a rich soil, and is propagated by offsets, and by seed.

26. I. *graminea*, var.—Requires the same treatment as the preceding one.

27. I. *acuta.*—Differs from I. *Sibirica*, which it very much resembles, in having striated leaves, a little shorter than the flower-stalk; in Sibirica the leaves are loose and spreading, much shorter than the stalk.

Acute-leaved Iris.—A variety of this also occurs in our gardens, with white flowers. It likes a rich soil, and is propagated by parting its roots.

28. I. *Virginica.*—Leaves sword-shaped; flower-stalk 2-cornered.—Bot. Mag. 703.

Virginian Iris.—Thrives in any garden soil, and is propagated by slips.

29. I. *Virginica*, var. *minor.*—Same treatment as the one above.

30. I. *Pseudacorus.*—Leaves sword-shaped; the alternate petals smaller than the stigma.

Yellow water Iris.—Frequently grows wild in Scotland, and generally inhabits ponds or sides of rivers. Although common, it has a very fine appearance in a border.

31. I. *fœtidissima.*—Leaves sword-shaped, flower-stalk 1-angled.

Stinking Gladwyn.—Grows in any garden soil. It is propagated by offsets, and by seed. Native of England.

32. I. *biglumis.*—No spathe, flowers 2 inches in height; it blossoms in September, and has the scent of violets. From these circumstances, and from the low situation of the flower, it differs

from all the known species and varieties of this genus.

It requires bog-earth with a mixture of sand, and is propagated by slips and seed.

33. I. *triflora.*—Willd. *Enum.*

Three-flowered Iris.—Thrives well in light soil, and is propagated in the same way as the above.

34. I. *prismatica.*—Stalk solid, round, of equal length with the leaves; leaves very narrow, long; capsules elongated, prismatic.—Bot. Mag. p. 1504.

Prismatic, or New Jersey Iris.—Requires bog or peat earth, and is propagated by offsets and seed.

III. *Corollas without beards, roots somewhat bulbous, leaves 4-angular.*

35. I. *tuberosa.*—Bot. Mag. 581.

Snake's head Iris.—This curious little iris is rather tender, and requires a south exposure, with a mixture of rich loam, and rotten tree-leaves. Root a tunicated bulb; leaves channelled.

36. I. *Xiphium.*—Leaves sword-shaped; channelled, awl-shaped stalk; 2-flowered petals, rather narrower than the stigmas. Germen round, triangular.

Small bulbous-rooted Iris.—There are a great many varieties of this species: some appear to be hybrids, betwixt Lusitanica, Xiphioides and juncea. It thrives best in a rich soil, and is propagated by bulbs and seed.

37. I. *Xiphioides.*—Leaves sword-shaped; channelled, awl-shaped stalk; 2-flowered petals, much broader than the stigmas. Germen acutely angled.

Great bulbous-rooted Iris.—Requires the same treatment as the one above.

38. I. *Xiphioides,* floribus albis.—Same as the two preceding.

39. I. *Lusitanica.*—Leaves channelled; stalk 2-flowered; inner segments of the corolla emarginated. Germen almost completely inclosed within the involucrum.

Portuguese flag.—Thrives well in a rich loamy soil, and is propagated by bulbs and seed.

The following species of the genus Iris are also in the collection at Carlowrie, but have not flowered this year, and some of them have never produced flowers in this country.

1. Iris *hæmatophylla,* from Lena river.
2. *Guldenstadtii.*
3. *Guldenstadtii,* var. *atomaria.*

4. Iris *brachycuspis.*—Lena river.
5. *Sibirica,* var. *altaica.*
6. *Hungarica.*
7. *notha.*—Biberstein.
8. *halophila.*—Bot. Mag. vol. xxii.
9. *halophila,* var. *altaica.*
10. *Susiana,* var. *major.*—Bot. Mag. vol. iii.
11. *Susiana,* var. *minor.*
12. *fulva.*—Bot. Mag. vol. xxxvi.
13. *pumila,* var. *alba.*
14. *pumila,* var. *lutea.*—Bot Mag. vol. xxx.
15. *lurida.*—Bot. Mag. vol. xviii.
16. *fimbriata.*—Bot. Mag. vol. xi.
17. *dichotoma.*—Bot. Register.
18. *Persica.*—Bot. Mag. vol. i.

List of Desiderata in the genus Iris, at Carlowrie garden.

1. Iris *arenaria.*—Walds and Kitaibel, Hungary.
2. *flavissima.*—Jacq. Icon. Rar. Siberia.
3. *biflora.*
4. *subbiflora.*—Bot. Mag. vol. xxviii. Lisbon.
5. *ventricosa.*
6. *lutescens.*—The plant in the collections under this name, about Edinburgh, is, I. *pumila,* var. *lutea.*

7. Iris *verna*.
8. *ruthenica*, var. *α*.
9. *tridentata*.—Carolina.
10. *unguiculata*.
11. *alata*.—Lam.
12. *neglecta*.—(Hornemann.)
13. *Bohemica*.—Schmidt.
14. *amœna*.—(Redouté.) Cultivated in Holland.
15. *flexuosa*.—(Murray.) Resembles I. *Sibirica*, but is bearded.
16. *Monnierii*.—(Decand.) From the garden of Le Monnier.
17. *stenogyna*.—(Decand.) In the Paris Garden.
18. *tenuifolia*.—Vahl, *Enum*.
19. *curtopetala*.—(Decand.) In the Paris Garden.
20. *reticulata*.—(Adam.) In Iberia.
21. *Caucasica*.
22. *Iberica*.—Steven.
23. *Nepalensis*.
24. *Pallasii*.
25. *virescens*.—Decand.
26. *elegans*.—Persoon.
27. *odorata*.—Persoon.

On the 5th December 1821, the Society's Honorary Medal was awarded to DAVID FALCONAR, Esq. of Carlowrie (but transferred by his desire to ALEXANDER FORRESTER, his gardener), for producing at different Meetings of the Council and Committee, during the year 1821, the greatest number of species and varieties of Iris in flower.—ED.

XXII.

Some Account of the Remains of the Ancient Orchards of Jedburgh.

By Thomas Shortreed, Esq. Jedburgh.

(Read 14th March 1822.)

There are the remains of many Orchards in and about Jedburgh. Almost every spot capable of being planted with fruit-trees seems to have been occupied in this way. The principal orchard is one which formerly belonged to the Monastery of Jedburgh. But besides this there were, and still exist, various other orchards on the same range of ground, extending down the Jed to the very end of the town; and also ranges of gardens to the north and west of the town, which once extended a great way, and were thickly planted with fruit-trees, many of which are still remaining. Jedburgh in former days, and till no very remote period, was famous for its fruit, its pears especially,

It is said that *Jedburgh* pears *(par excellence)*, were frequently cried in the Streets of London.

The principal orchard above mentioned, commonly called " The Ladies' Yards," and, in the old title-deeds of the property, styled " The Convent Yards of the Monastery," appears at one time to have occupied about five English acres. It is a flat piece of deep, rich, alluvial soil, lying to the south of the town, and round which the Jed makes a beautiful sweep. It was at one time a very fine orchard. It had been planted with a great variety of fruit-trees, chiefly pears; at least the apple-trees are not remembered as being very ancient, probably from their being shorter lived than pears. Tradition says, and I believe with truth, that the oldest trees were brought from France and planted by the Monks, and that they are nearly coeval with the Monastery. I have no doubt that some of the pear-trees existing within these twenty years, and even a few that still remain, were at least 500 or 600 years old. The soil of this orchard, like that of most of the others about the town, is very black, and of the richest quality, though somewhat worn out by long continued heavy cropping, and requiring some stimulus or deep trenching occasionally to make it productive.

The kinds of Pears still existing, or remembered to have existed, in the Orchards of Jedburgh, are, the

Grey Longueville.
Green Longueville.
White Warden or Monks' Pear.
Grey Warden.
Drummond, Grey and Red.
Musk Pear.
White Achan.
Grey Achan.
Pound Pear.
Grey Goodwife of Glasgow.
Rob Hynd.
Worry-carle.
Bell-tongue Pear.
Scots Bergamot.
Crawfurd or Ballencrieff Pear.
Lady Lamont.
Grey and Red Honey.
Douglas Pear.
Mother Cob.
Fair Maid.
Pitfirrane.
Bon-Chrêtien.
Ludd Pear.
Buchanan Pear.
Cranstoun Pear.

It will be understood that in this enumeration I refer only to very old sorts of pears now existing; for it is not my object in the present sketch to give a catalogue of *all* the sorts that *once* existed, or that are *now* cultivated. Some of the former have died out; and many of the latter are of modern introduction, so that any information regarding them would not be either new or acceptable.

The information I have obtained from different persons, respecting the several sorts now enumerated, has not in every instance agreed, people often differing in their names of the same pear, and in other particulars. But as I took some pains to ascertain the real facts, I venture to put down the

result of my enquiries, as being on the whole pretty near the truth, although I am persuaded that my statements must be in some little particulars not so accurate as I could wish. By the phrase *original trees*, I will be understood to mean trees of equal or nearly equal antiquity with those in the Ladies' Yards.

1. *Longueville.*—Of this excellent pear only two old trees remain, which may be considered as coeval with the trees in the Ladies' Yards; and as the latter are said to have been introduced and planted by the Monks, it is fair to suppose we owe the Longueville to the good fathers also. These two trees are both of the *grey* sort, which is the largest and most delicious pear. One of these still produces extremely fine fruit, superior in size and flavour to that of younger trees. But the reverse is the case with the other tree. The first mentioned of these lost its top in a late storm of wind by which it is much injured. Of the *Green Longueville* no original trees remain, but plenty of both sorts are propagated.

These pears, from their great weight, and from the rather slender growth of the young branches, are very apt to be shaken off by the wind when nearly ripe. The specific gravity of the wood of the Longueville, which is greater than that of most other pears, added to the form of the branches,

renders this tree more easily affected by the wind. It is observable of this tree, that even when very young it acquires a rustiness or roughness in the bark, which gives it the appearance of being affected with the canker. But this rugosity is in fact very different, and produces no bad effects upon the growth of the tree. I have observed it in a young tree grafted only one year, and very frequently in the last year's shoots of an old tree. Upon a wall, this pear would attain to the highest perfection, and would surpass many of the best ordinary wall sorts. It would be safe from danger from the wind too.

2. *Warden or Monks' Pear.*—Within these forty years, there were at least fifteen of these trees in the Ladies' Yards alone, some of them of immense size. This sort appears to have attained to a greater size than any other pear. Among the very few that still remain in the Ladies' Yards, are *two* noble trunks of the White Warden, the girth of one of which, two feet from the ground, is about $8\frac{1}{2}$ feet. Twenty years ago this tree was the admiration of all who saw it, and it still remains a grand specimen of the size to which the White Warden had attained. The other, which has once been a great tree, is thrown over on its side. Both yet bear pears upon the extreme branches, of a good size, but few in number. In two or three years

the trees will cease to exist, as they are very much decayed.

The Warden bore great crops. Sixty years ago, when carriages were generally performed upon horses' backs, the Newcastle carrier is said to have kept five horses constantly employed for one season in carrying to Newcastle pears of the White Warden, the produce of one orchard alone, and that not the largest in the town. Not many years back, fifteen bolls have been produced from one orchard in a season. A boll of fruit here is thirty-one or thirty-two Jedburgh half-fulls, or about fifteen firlots.

The loss of the *Grey* Warden would not be matter of much regret, as it is a coarse and harsh pear; but the *White* Warden, though inferior to several others, has many claims upon our care and attention, as it generally bears a good crop when other sorts fail; and in a good season this pear is not only very large and of a handsome shape, but really of good quality, being mellow, and pleasant tasted when pared. It possesses the quality of never chilling the mouth when eaten in cold weather, like the Achan and other juicy pears.

From the size and colour of the White Warden, it is a favourite in the market, and meets invariably with a ready sale at the Border fairs. They not unusually brought at the rate of 10s. the Win-

chester bushel. Eight years ago, from the few trees then remaining in the Ladies' Yards, a gardener got 100 half-fulls, which he disposed of in a week at the Northumberland fairs, and drew L. 20 for them.

A circumstance respecting one of the Wardens in the Ladies' Yards worthy of notice, occurred a few years ago. The tree was split in a storm of wind, and a large iron bolt was found in the heart of it, which had probably been used formerly to keep the trunk together, as it appeared to have been long ago split in a similar manner. The wood had grown over the iron for many inches at both ends.

There are two existing instances of this tree having fallen over, and taken root again at the broadside of the trunk. One of these, a Grey Warden, has a root as thick as a man's arm, issuing from the trunk 15 or 20 feet from the place of the original root, which is quite worn away and separated from the ground. It bears as well as its age admits. The other instance is still more remarkable. This tree, a White Warden, is said by tradition to have been blown down in a storm the night King James left Scotland to go to England. It had five principal clefts or branches which all touched the ground, nearer or further from the trunk, and each in process of time took root and became a separate tree. A clump of three of these

is still standing, and in a fine bearing state ; a fourth existed three years ago.

3. *Drummond.*—Of this tree several originals of both sorts (the grey and the red) remain, and there are plenty of younger trees in full bearing.

4. *The Musk Pear,*—was an autumn pear of good quality, of the size and shape of a Ballencrieff. The trees are dead out, and none of the variety is now propagated.

5. *White Achan.*—This excellent pear has been dead out for 25 years, and it has not been propagated, which is much to be regretted. It was a large and very beautiful pear, of a light cream colour, with a slight blue tinge on one side. It was a very heavy pear, and, after being kept a short time, it melted like honey in the mouth when eaten.

6. *Grey Achan.*—I do not know whether any original trees remain, but there are plenty of very old trees, which bear pretty well, and abundance are propagated.

7. *Pound Pear.*—So called from its weight. One or two are left. It is not a good pear, but is

commonly used for baking. It has not been much propagated.

8. *Grey Goodwife of Glasgow.*—This is but a bad pear, something like the Grey Warden. One original tree remains. I believe it is not propagated.

9. *Rob Hynd.*—This is a tolerably good pear, something like a Drummond, but inferior in quality. One original remains, and I believe the variety is not propagated.

10. *Worry-Carle.*—As its name denotes, this was a very bad pear, and has only met with justice in being allowed to die out. It could hardly be used as a pear for eating; and, like the Grey Warden, and other inferior sorts, might probably be used only for making perry.

11. *Bell-tongue.*—This variety still exists. It is not a very good pear, and is shaped like a jargonelle. The tree takes root in the same manner as the Warden above mentioned. One of them is said to have been thrown down at the same time with the Warden, that fell in 1603. It had fallen across a large ditch, and taken root on the other side. My informant recollects, when a boy, of running in the ditch below the trunk.

12. *Scotch Bergamot.*—A small pear of good quality; one original remains. The variety is not much propagated.

13. *Crawfurd or Ballencrieff.*—A summer pear of good quality, common I believe in Scotland. No originals are left, but plenty of oldish and young trees. There are instances of this tree taking root again in the way mentioned above of the Warden.

14. *Lady Lamont.*—A very early summer pear, of a musky smell and high flavour. A great many very old trees remain.

15. *Grey and Red Honey.*—Two very old trees of the grey sort, I believe, remain. It is a very good autumn pear, shaped like an Achan, but a little larger. I am doubtful whether the name given be correctly applied to the variety referred to. But I could not obtain more precise information.

16. *Douglas Pear.*—This tree remains, but is not propagated, though, according to my information, it well deserves to be cultivated. It is an excellent pear, shaped like the Achan, lightish coloured, and tinged with red, resembling very much the White Achan, mentioned above as extinct. It will keep till the month of May.

17. *Mother Cob.*—This was a large round pear of a dark grey colour; not good. None of the variety now exists; the last died about fifteen or twenty years ago.

18. *Fair Maid.*—An indifferent pear, rather dry, and apt to rot in the heart; larger than the Ballencrieff, which it somewhat resembles in shape; of a beautiful white colour, with a slight tinge of red on one side. Dead out here within these few years, but the variety exists in the neighbourhood.

19. *Bon Chrétien.*—Two very fine old trees of the summer variety remain, which bear well. The fruit is very large and well flavoured, and is not a great deal inferior to the Jargonelle.

20. *Pitfirran.*—I cannot ascertain whether this variety still exists. It was a small summer pear, of good quality, freckled with grey spots like the Muirfowl egg.

21. *Ludd Pear.*—Of this sort two original trees exist. It is a good pear, not unlike the English Bergamot, but somewhat larger.

22. *Buchanan.*—About fifty years ago there was a considerable number of *original* trees taken up, and

none now exist, except two of about fifty years old, which occasionally produce fine crops, but are not certain bearers. It is a juicy autumn pear, which keeps but a short time, soon failing at the heart. But of all the pear tribe here, the tree seems to thrive the kindliest, and grows freely, without a gall, rising to a great height in a short time; and is never known to canker. The young pears, when just formed, after the blossom, are not apt to be affected with late frosts, which hurt other sorts, and to which we are a good deal subject at Jedburgh.

23. *Cranstoun.*—A winter pear of rather coarse quality, used for baking, of a large size, something of the colour of a ripe Achan, reddish-grey, but coarser looking. It is extinct within these few years.

Such is the information I have been able to gather regarding our once celebrated Jedburgh Orchards, which now deserve, perhaps, little commendation. Many other varieties, of which there is now no account, may have existed besides those I have noticed. Some people wonder, that while several very old trees exist of good sorts, young ones are either not propagated at all, or very rarely. But till within these few years, when horticulture has come more into repute, and a stimulus to improvement has been created by the establishment

of Societies for encouraging the cultivation of fruit, and diffusing a more extensive and liberal knowledge of the art of gardening, there was little inducement for the few gardeners here to bestow much pains upon the culture of trees, which they, perhaps, conceived did not bear fruit till they were very old. But the principal cause of the want of a regular succession of trees may be, that the soil of the Orchards is worn out from the long standing of the old trees, and from the surface being, for the most part, severely scourged with under crops. They are thus rendered incapable of producing a succession of the same sorts of trees, these being apt either to canker soon, or to prove very unfruitful. This is very much the case in the Ladies' Yards, where young trees canker quickly. It is no new information to state, that pear-trees will succeed better where apples have grown than after their own kind, and *vice versa.*

From the number of bad sorts of pears left to us by our forefathers and the Monks, I am led to think they had used these, not only for making a beverage like perry, but as vegetables and articles of food, at a period when the means of life were scanty. Certainly many of the kinds, such as the Worry-Carle, Grey Warden, and others, were never used as luxuries, or delicacies, like most other fruits; for they were too wise to stock their orchards with trees of inferior sorts, although

good bearers, while they had many others of excellent quality, had it not been that the scarcity of the articles of living had led them to cultivate trees from which they were *sure* of enjoying a crop, which they could use in some measure as we now do turnips and potatoes, that were both then unknown *.

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* Since writing the foregoing, I have learnt that my notion upon this particular has not been very incorrect, for a gardener here has lately informed me, that he had once a large quantity of the *Worry-Carle* (one of the worst pears I have noticed), in his possession, which, as they were known to be coarse pears, he laid up in a bye corner on the ground floor of a stable, in some hopes of their improving and becoming fit for eating. They were in vain offered to sale in the market, and actually lay twelve months without any apparent change, their dusky green colour being, at the end of that time, nearly as fresh as when they were taken from the tree. As they continued hard and insipid he at length thought of boiling them, and by that process they became very palateable, and, as my informant expressed it, " as sweet " as sugar."

XXIII.

Remarks on raising New Varieties of Pink.

By Mr George Nicol, Gardener, Edinburgh.

(Read at a Meeting of the Caledonian Horticultural Society.)

The following notices would never have been presented to the public, had not the Caledonian Horticultural Society advertised, in their Prize Questions for an "account of ascertained facts concerning the effects of impregnation, in improving and diversifying the different species of fruits, vegetables, and flowers." The "Treatise on Fruit-trees," by the ingenious Mr Knight, having been put into my hands by a member of the Society, I learned his mode of proceeding with the blossoms of fruit-trees; but having no trees in a fruiting state under my care, I directed my attention solely to flowers, and especially to the common pink, *Dianthus Caryophyllus*.

On account of the very different tribe of plants on which my experiments were tried, I could not

very closely follow Mr KNIGHT's plans, nor were the results entirely similar; but in the end they were found to confirm the practicability of his schemes, and the truth of his doctrines.

The properly double flowers, or *flores pleni*, of any species of plant, have neither stamina nor style, male nor female organs; the whole being transformed into petals. Such flowers are the pride of the florist, but of no use to the experimental cultivator, who is desirous of varying his flowers by crossing of breeds.

The perfectly double or *full* varieties of the Stock-gilliflower (Cheiranthus incanus and annuus), have long been supposed capable of impregnating the single varieties of stocks, and have been carefully, regularly, and formally selected for that purpose, by planting single stocks close by them. But such plans are quite nugatory. Any double-flowered stocks that spring from seed saved under these circumstances, must arise from the pure unassisted sporting of nature in the single flowers, or perhaps, from their being raised in rich soils, in sheltered places, and being carefully attended to. The intermediate state of fulness, when a stock becomes a *flos multiplicatus*, is not often to be seen; yet there are instances of their approach to a full state, by their at first having a few petals more than the regular number, which is four.

The case, however, is different with the flowers of some other genera; for example, those of the Dianthus, which frequently occur multiplicate or nearly full, but still possess some of the organs necessary to reproduction. It would be unconnected with the present subject, to detail any thing respecting the cultivation of the pink by laying and piping, as these modes only tend to increase the quantity, and preserve the qualities of varieties already in existence. All that is meant on the present occasion, is briefly to relate a few experiments that have been made on the saving of seed from semi-double or almost full flowers of the common garden pink.

There are scarcely any varieties of multiplicate-flowered pinks, but what will produce seed, more or less, according to circumstances, either as to situation, season, or impregnation. The female parts in them appear generally to be perfect; the only want is male organs to impregnate them, and make the seed come to perfection. The form of seeds will indeed be found in all their capsules; but although one or more stamina are often observed in the flowers, yet, from a defect in general of their being shorter than in the single flowers, and from the exuberance of petals in many of the varieties, they very rarely can approach the pistil; so that the seeds resulting are defective, or incapable of germination.

This points out that we can never look with confidence to the male functions being performed in multiplicate-flowers, as in them the male organs are generally the defective parts. As females, we may expect them to perform their part of the fructification; but the pollen may often have to be applied by art.

To remedy the defect of the males, I impregnated the female organs of a few varieties of multiplicate pinks, with the farina of the best single pinks I could procure. Those so impregnated, were the flowers of two-year old plants, from pipings, standing in a warm, south exposure. The success surpassed my most sanguine expectation. I saved from those so impregnated about 200 seeds. This experiment was made so long ago as the summer of 1811. The seeds were sown, in a frame only, in March 1812. In that same year they shewed good promise of their future value. In 1813 they produced thirty-five double varieties, many of them excellent, and few of them but what might be termed *Florists' flowers*. A number of good judges saw them in flower, among whom were several members of the Society, both professional and amateur, who allowed them to be the best collection they had ever seen raised from seed at one sowing, considering the small quantity of seed.

Through want of leisure, and having many other

avocations, I omitted, in 1812, to impregnate any flowers. This threw me behind in the prosecution of my experiments.

In 1813, I impregnated a considerable number of multiplicate-flowers of plants of the former year's pipings. These I find to answer best; as, not having more than one spike of flowers, they are more vigorous and can be more accurately done. Those so impregnated were growing in a northerly situation; yet they produced seed. Others so impregnated in an apparently more eligible situation, produced comparatively little. These last were two-year old plants, growing in a warm, south exposure, the same in which those impregnated in 1811, which succeeded well, had been grown.

It remains, therefore, yet to be determined, whether the situation or the age of the flowers may not have considerable effect in their not seeding so abundantly. I am at present inclined to think there is a certain stage of the flowers more answerable for the work of impregnation than any other; for in 1814, I went over them at various times of the day, and at different stages of the flowers,—a trouble for which I was fully compensated, by saving about 3 oz. of good well-ripened seed. Some of the flowers I repeatedly impregnated with the pollen of the Maiden Pink (Dianthus deltoides), and others with that of Sweet William (Dianthus barbatus), the last of which is richly furnished

with pollen. It will not be thought unreasonable to suppose, that mules may be obtained in this way. But it must be observed, the plants were impregnated with the farina from single pinks also.

The process of artificial impregnation, or, in other words, assisting nature, may appear to some a work of great labour and minuteness. But it is, in the case of the pink, very simple. In most other genera it is necessary to divest the flower of its own stamina in an early stage of its growth; but in the pink this is not necessary, as the stamina are naturally defective. The mere contact of the antheræ of the single pink, with the pistil of the multiplicate, and the shedding some of the pollen upon it, is all that is required; and a great many plants may be gone over in a very short time.

It is a practice with most of the growers of pinks from seed, as it was also with myself, to throw out the single flowers, as soon as they shewed themselves. But this is an erroneous practice. It is not certainly necessary to keep all the single flowers that come from seed, as there is in most cases a much greater proportion of single than of double flowers; but all single flowers of good colour and good leaf ought to be preserved, as it is from them the qualities of the future flowers will be determined, as to colour and leaf. This fact was conspicuous in those grown from the impregnated

seeds of 1811; few of them retaining any of the properties of the females, except the doubleness of flower.

From my experiments I find, that although some of the multiplicate-flowers may have a few male organs, and may impregnate themselves, yet this does not tend to increase the varieties so much, as when they are impregnated by other sorts; nor is there such a certainty of procuring fertile seed.

In 1811, and again in 1813 and 1814, the impregnated flowers were the only ones that produced perfect seed in abundance. As to the increase of the varieties, from the impregnated flowers, it was very evident; and, in general, as already remarked, there was little difficulty in tracing their characters back to the male parent.

I may add, that, in 1813, my seedling pinks raised in the above mode, were found entitled to two medals as seedlings, and in 1814 to two medals as established flowers, from different institutions for the encouragement of horticulture.

The same system holds equally good in the genus Primula. In 1820, I impregnated a number of Polyanthus flowers, growing under glass, in a south exposure, and never shaded from the sun.

The following results were obtained. Turner's Princess of Wales, impregnated with Nicolson's Tantanrara, produced seedlings which had the cup

around the antheræ and the dark orange centre, for which the latter is conspicuous; while the colour of the petal, and the lacings around it, retained an exact similarity to those of the mother. Two other sorts so impregnated were so conspicuously characterized, that although no account had been kept of their pedigree, there would have been no difficulty in tracing it. The quantity of seed saved in this way was very small. I raised only twenty-eight plants. Out of these, no fewer than twenty-two proved so excellent, as to be ranked as stage-flowers. Many of them indeed, were of uncommon beauty, and they obtained the medal as the best seedlings in 1822.

There seems no doubt of the Auricula succeeding in the same way, to a much greater degree of perfection, than when left to chance; for it is pretty evident, that as long as their own stamina remain with them, there is little probability of the pollen of any other sort getting in contact with the pistils.

EDINBURGH,
1st February 1815.

XXIV.

Horticultural Communications from Mr John Young.

I. *On the cause of the Curl in the Potato, and the means of prevention.*

(Read 13th September 1814.*)*

The curl in the potato may arise from two causes. The first is, employing over ripe tubers; that is, when the crop that the tubers are taken from is allowed to remain in the ground till the potatoes are perfectly mealy (as it is termed), or until the vegetable sap that lodges in the root or tuber, and which constitutes the vigour of the future plant, is exhausted. Hence the young stem rises weakly, or what is usually termed *curly*.

The second cause of the curl is, the employment of seed-stock that has been improperly kept during winter. The seed-potatoes are often stored in a place where so great a quantity of air, light, or heat reaches them, as to exhale the

juices, and render the future plant weak and curled, as above.

The first of these causes has been sufficiently explained by the late Mr T. Dickson's excellent paper upon the subject, already before the Society, so that it is unnecessary for me to dwell upon it any farther, than to say, that I made similar experiments about the same time, with similar results.

As to the second, I shall first relate two cases that happened to myself, and then detail an experiment made lately, suggested by these cases.

Happening to be at a place where the people were taking up their potatoes, a kidney kind struck my fancy, of which I requested a breed. I got three which I brought home, and laid on a shelf in the seed-room, where they were allowed to remain all winter, and until the following planting season. At that time, by being exposed to the light and dry air of the place, they were perfectly green and shrivelled, but as I was certain that the frost had never reached them, I planted them in a spot by themselves; but to my surprise, every plant of them was curled, and the whole consequently thrown away, as a bad kind.

The other case happened some years afterwards, with a quantity of the red-nosed kidney, which were laid into a loft, immediately above where a fire was constantly kept, and close to the wall,

where the chimney passed, being close covered with straw, to guard them from any frost that might penetrate through the roof. This was considered as a place of safety, and although the potatoes appeared perfectly plump, and retained their natural colour, at the time of planting, almost the whole of the crop turned out to be curled, to my great disappointment, as there was a considerable space of ground planted with them.

These two cases passed at the time as mere matters of course, without leading me to consider what had been the cause of the curl, nor did it ever strike me that it had originated from the improper manner of keeping, till last season, when taking up the potato crop. At that time, reflecting that these circumstances might have happened from some improper mode of keeping the potatoes through the winter, and to ascertain if it was from that cause, I resolved to make the following experiment.

About the 1st of February I picked about half a peck of the red-nosed kidney, which I kept in a basket, in a room where no fire was, exposing them to all the light, air and sunshine, that the severity of the spring would admit of, with safety, till the 3d of May, when they were planted; at which time they were perfectly green and soft, but not shrivelled. To make a fair experiment, I planted every alternate row with the same sort of

potato which had been taken up in Autumn, upon the same day, but which had lain in a pit all winter, from which they had been taken a few days previous to planting. Although there were not so many curls amongst those kept in the basket, as in the two former cases, yet there were enough to convince me that my conjecture was right; there being $\frac{1}{15}$th part of the exposed potatoes curled, while, among those taken from the pit, there was not one. The reason there was not more curl among the former, might be owing to their not being long enough exposed, and the place being low and damp, which had not allowed the juices to exhale so fast. The exposed potatoes, at the time of planting, were sprung only about half an inch at the waxy ends, while all the eyes of the mealy ends were dormant. The potatoes that were taken from the pit were sprung at almost every eye, from one to two inches. Yet, although they appeared to have the advantage at the time of planting, the exposed potatoes were above ground before them about a week; for I could perceive the rows of them distinctly from end to end, (which must have been from a certain stimulus given them, from their being so long kept out of the ground), when I could only observe some of the others peeping through the ground here and there. They continued to have the advantage of growth till the time they came first into flower, when they

were equally vigorous; after that time, the others became the most vigorous, and appeared to continue so during the remainder of their growth. The exposed potatoes appeared to be dwarfish, and their growth had the appearance of being soonest over, which I think can be accounted for in no other way than by their juices being partly exhausted, though not in such quantity as to render them completely curled.

From this it appears, that the best means of preventing the curl in potato, is to take care that those intended for seed should not be too ripe; and also that they should be so stored that they may lose as little of their juices as possible. Those for seed should be either later in planting, or taken up before the general crop, which will be sooner or later, according as the season is early or late. When the stems give over growing is a very good time, as after that they will not collect any more juices, and probably the stems may draw from the tubers part of the juices before collected, which they cannot do after the potatoes are detached from the parent plant. It would be needless to say any thing upon the storing the potatoes, as that is a practice that is well known.

The propriety of this practice will be sufficiently obvious, if we consider that each potato is merely a reservoir of vegetable sap for the production of a future progeny, by lateral propa-

gation, and, therefore, that they ought to be taken up when they contain the greatest quantity of that fluid, and before it is exhausted by remaining too long in the ground.

I have reason to believe, that the curl arises more from over ripe seed than from the improper manner of keeping; yet there may be instances where it may arise from that cause, through inadvertency, as happened to myself in the two cases above mentioned.

Allow me to add a few observations connected with the above subject. There is more curl this season (1814), in this part of the country, than there has been for the seven years preceding, and in early districts more so, than in those places that are later. Last summer and harvest (1813) were remarkably warm and dry, which so ripened the potato crop, that they received no check in their growth. It is also observable, that these sorts that contain the greatest quantity of farinaceous matter, such as the leather-coat and red-nosed kidney, are worst with the curl, which is one strong proof that over ripe tubers produce it. On the other hand, last summer there was not one curl that I could perceive. The reason of which, I conceive, was: on the night between the 24th and 25th September 1812, we had a very smart frost, which destroyed all the potato stems, so

that they grew no more that season; thus producing the same effect as if they had been taken up. This I consider as a strong evidence of the necessity of taking up seed potatoes early, as a preventive of the curl.

There is another circumstance I beg leave to relate. Passing lately through the grounds of a respectable farmer in this neighbourhood, he shewed me a field of potatoes that was very much curled, and, at the same time, a quantity in the same field that belonged to some of his cottagers, quite free of it. He told me that he always picked the largest and the best of his potatoes for the seed, while those of his cottagers were planted with the small ones, that had not been considered as fit for eating, and all of them planted whole without any cutting. This probably arose from the large potatoes being perfectly ripened, when the small potatoes, not being full grown at the time of being taken up, contained more of the vegetable sap, according to their bulk. This seems another strong proof of what has been before advanced.

I may add, that I once had an opportunity of seeing a plot of potatoes which were completely curled, and on enquiry was informed that the tubers had been cut into sets a considerable time before planting, and had been allowed to remain in an open shed during that time; while a plot

in the same garden, which had been planted at the same time from sets taken from the same heap, but which were cut at the time of planting, was entirely free from it. And as a proof of over ripe potatoes producing the curl, I may refer to what occurs in all the *early* districts of the country, where it is always most prevalent, where the farmers are obliged frequently to purchase a great part of their seed-stock from those in the higher or later districts; while the farmer in the latter, never thinks of changing his seed stock, unless it be to purchase a new or strongly recommended variety.

It may be considered a bold assertion, that the tubers of a plant, which was originally a native of the warmer provinces of America, should be over-ripened in the climate of Scotland, so as to produce disease. But a tuber is very different from true seed. Perhaps in the country where potatoes are native, their culture may chiefly consist in being raised from the *real seed* (which is never done here, but for the sake of getting new varieties), and not as with us from cuttings, if I may use the expression, taken from the tubers, which are only an elongation of the original, and consequently carry along with them whatever disease or debility is inherent in the parents, from which they sprung. Now, this debility may be greatly accelerated by the plants having been cultivated

in an early district, which hastens them sooner to the period of their maturity, by the tubers being better ripened or rendered more farinaceous, than in that which is cold and later, where their produce is more soft and aqueous, which afford the best plants.

BELMONT CASTLE,
29th August 1814.

II. *Account of a Method of Pitting and Planting Trees upon thin, bare, moorish ground.*

(Read 10th June 1817.*)*

THOUGH the greater part of our moors are only a thin stratum of light, sandy, or bare moorish soil, upon a substratum of till, gravel or sand, yet all the different kinds of our forest trees will thrive in a greater or lesser degree upon them. The trees usually planted on such situations are seldom pitted, yet, if the plantation be mixed, it may be necessary to pit a number of the plants, especially those which are termed hard wood, as, from the length of their roots, they cannot be planted with propriety in the common way. I am no advocate for placing large plants in such soils, but would recommend that all trees, of the hard wood kinds particularly, should be one year or two years

transplanted, to cause them to make more fibres, and to enable them to draw more nourishment after being removed to such situations. Hence, it will be perceived, that the trees proposed to be planted will not require large pits, which would not suit with the method I am about to recommend.

I have also to premise that it is an established practice among gardeners in planting the finer kinds of trees, to place them in a richer soil or compost prepared on purpose for them, a quantity of which is brought to each tree, and the roots bedded in it; as experience shews, that a tree will grow and thrive in a soil in which they will not strike freely. Keeping this in view, it is a duty incumbent upon all planters to follow up the practice, as far as circumstances will permit. It is not to be supposed, in planting great plantations, that a quantity of finer soil can be brought to each plant, but something may be done with what the local situation affords. As it will surely be granted, that the surface soil is best, in any situation, for placing the young plants in, being composed of the decayed vegetables that may have grown upon it; therefore, if we can plant a tree in such, without any admixture of the subsoil, the chance of striking will be greater. The method I have taken to effect this is simply this : To cast the pits as nearly square as possible, the size say from twelve

to fifteen inches, turning out the turf whole, laying it upon one side of the pit, with the grass side downwards, giving it a stroke or two with the spade straight across the middle, parallel to each of the sides, to divide it as nearly as possible into two equal parts. In such soils it will generally rise completely from the substratum, but if any of the surface mould remains, take it off by itself, and lay it beside the turf; then take out the subsoil to the depth that is wanted, laying it upon the opposite side of the pit. It is of advantage that some time elapse between the pitting and planting, to allow the frost to ameliorate the soil. Then, in the planting, take up the turf whole as it lies, by introducing the spade below it in the opposite direction of the cross cut, and lay it exactly into the mouth of the pit, without turning the spade, so that the grass side may be still downwards; when its weight, by being hollow in the middle, will break asunder any part left uncut when it was turned out, and, by resting upon the edges of the pit, the earth sides, which were uppermost of the two pieces, will naturally fall together, the one-half of the turf being in the one side of the pit, and the other immediately opposite on the other, being both upon their edges, with the grass side of each next the sides of the pit. Insert the spade between them, pushing it backwards and forwards so as to press them close to

the sides of the pit, and pressing them down to the bottom of it with the foot at the same time; then, by a stroke or two with the spade upon each of the halves, pare off all the earth from them, which then will leave only a very thin turf, being the strong roots of the grasses or other vegetables, of about an inch thick: by giving the earth pared off a turn or two with the spade, unless it is very tenacious, it will be made perfectly fine. Having taken out a quantity, lay it beside the surface mould that may have been taken out at the time of pitting, then, having made the earth in the pit level, insert the plant, covering the roots with the remainder of the surface mould: or, if the soil is free and tender, you may pare down one of the halves of the turf, laying it level; then inserting the plant, pare down the earth off the other half of the turf over the roots, filling in any surface mould that remains; after which, fill up the pit with the earth that was taken out of the substratum, finishing the whole by making the surface perfectly level, and treading the plant firm.

It is obvious, that, by the above practice, the plant is inserted into the very best soil that the situation affords, consequently the chance of growing is greater than if the roots were bedded in the till, or whatever composes the substratum. Also, the decomposition of the turf, of whatever vegetables it may consist, will serve as a manure

for the roots of the plant to strike into, and enable it to set off with greater vigour. This is surely more rational than the common method of paring the turf and laying it uppermost, with the intention of keeping out the drought. At the same time, there could not be a more effectual mode devised to shoot off rain, instead of catching it, when a hasty shower falls, which is common in the summer months, especially if the ground has any considerable acclivity, and attention has not been paid to make the surface level, or rather to decline a little the opposite way of the ground; whereas the subsoil being uppermost, the surface of the pit being level, receives and retains every drop of rain that falls upon it.

From the length of the above detail, which it was necessary to give minutely, in order to be understood, it may be supposed by some, that the operation is tedious, and will take a great deal of time; but after the workman gets into the method, it will be found to take less time than the common way: it likewise prevents, as much as possible, any of the mould being lost by falling in among the roots of the grass or heath, and is also more easily done than when the turf is lying level on the surface of the earth.

Bridgend, Perth,
30*th May* 1817.

III. *Hints on the Cultivation of the Strawberry.*

(Read 9th June 1818.*)*

The Strawberry (Fragaria), of which there are several species, and numerous varieties, is one of the finest fruits of the season, and has long been in cultivation in every garden, from that of the Prince down to the peasant, and it may be supposed that little can be said upon its culture, as it is a plant that thrives almost in every place. All that is meant at this time is, only to point out where part of its culture is erroneous, and by what methods it may reasonably be improved.

The first error we shall mention is, cutting over the plants after the fruit is gathered. This is practised in many places, and probably originated from the rambling growth of the plant, which soon runs into confusion, it being necessary to keep it within bounds. Therefore, soon after the strawberry season, the plants are all *dressed;* which is done by cutting off the leaves and runners, hoeing between the rows, and raking off the rubbish, making the whole neat and clean. However desirable it is to have every part of the garden in the best order, having the plants to produce better crops and finer fruit would doubtless be preferred. This can-

not reasonably be expected, when we consider, that, by cutting over the leaves, we divest the plants of all the sap they contained, and which was in preparation to be deposited in the buds, for the production of the next year's crop, in the same way that taking off the leaves prematurely from a vine-shoot, prevents it from producing fruit the next season, as, wherever a leaf was taken off, that bud will not show a single bunch. It is natural to suppose the same effect, to a certain extent, will be produced by the strawberry leaves. Further, the plants being exposed to frost, are apt to be hurt in winter, from the want of that protection the old leaves would have afforded, and the weakness of themselves, from what should have strengthened the plants being forcibly taken from them. It is true that, by cutting over the plants at that time, they will put forth a new set of leaves. So much the worse. This being an extraordinary effort of the living principle, to restore what had been prematurely destroyed, and only exhausting the plant faster, as the autumnal frosts generally set in and destroy those leaves, before they can perform their functions. It is in fact putting nature to the expence of two suits in a season, when she would have been content with one, and to better purpose.

There is another part of the general culture which is improper, that is, digging between the rows every winter. Sometimes this is done for the

sake of manuring them, by digging in a little rotten dung among them, or sometimes it is done merely to expose the soil to the action of the weather, both of which are wrong. From the state that the ground should be in at the time they are planted, they will not require to be manured, unless they are allowed to remain too long in one place. The roots on each side of the plants, being all cut or broken in the operation, do not produce fibres freely; therefore, the plants cannot set off in spring with the same vigour as if undisturbed. Hence they show their blossom weakly, at a time when all the strength of the plants is requisite to resist the changes of the weather that frequently prevail at the time they come into flower. This renders a great number of the flowers abortive, and even those that set do not swell freely, so that the fruit is hardly worth the gathering. By the time the plants have regained their strength and vigour, which is perceptible upon their foliage about the time the fruit ripens, they have again to submit to being cut over, before their leaves can perform their office, which has been likewise considerably retarded, by their roots being disturbed and broken off. This repeated annually, no wonder that the crop gets worse and worse every year, till at length the plants become almost barren, and require a considerable breadth of ground to give a dish daily, for the supply of an ordinary family. Moreover, in soils that are

apt to throw out in winter, the digging between the rows hastens it; for the ground being bare, allows the frost to act with greater force, and the side-roots being broken in the operation, only the downright or tap roots remain, which are easily torn asunder; thus the plants are in no better state in spring than if they had been newly planted.

Having mentioned what we consider errors in the cultivation of the strawberry, we come next to point out in what manner it may be improved.

In the first place, the plants ought to be planted in good rich ground, and in an open situation, in a compartment by themselves, not as edging to walks or borders, as is sometimes done, nor between the rows of gooseberries, &c. in all which places they may be considered as secondary, where their culture must be regulated by the principal crop, of whatever kind it may be. Where they are cultivated in a spot by themselves, their culture can be regulated on their own account entirely. Spring is to be preferred to autumn for planting (the plants having been taken off and planted in nursery lines the end of the summer preceding), as it is seldom that those planted at the last mentioned period are sufficiently established to resist the severity of winter, which commonly throws a great number of the plants out of the ground and destroys them; and although the

deficiencies are made up in the following spring, they never come away so regularly as if planted altogether at that time, when they have the whole growth of the summer to establish themselves before the winter sets in. If they are allowed sufficient room between the rows, a slight crop, such as lettuce or small salading, may be sown in drills between them, which will all be removed before their runners have made much progress. All the care necessary for the season is only to keep them clean, which, after the runners are considerably advanced, can only be done by hand-weeding, allowing them to continue as they are till the following spring. Then, as soon as the weather sets in dry, let them be divested of all the runners *

* It is a question whether the strawberry runners exhaust the plants so much as is generally imagined. When the plants shoot up into flower, they throw out their runners, having each a bud or young plant in embryo upon their extremities, which, after being pushed forward a certain length, strikes its tender roots into the soil, expanding its leaves at the same time, so as to be able to generate sap for itself. After it has gained strength, it in its turn pushes forward a runner, and sometimes two, whose buds also strike root, and again push forth runners in their turn, and so on from one to another, till the growth stop for the season. This they will do, although the runner be cut or otherwise destroyed, which connects the parent plant and the first bud or young plant, provided it be sufficiently established before that is done, and so on with all the other plants or buds in their turn. This is to be understood of plants growing in the natural ground, as those growing in pots, for early

of the preceding year, hoeing the ground between the rows, and raking off all haulm of rotten leaves or runners, making the whole neat. They will need no other culture during the summer but only to be kept clear of weeds: a good preventive would be to give the ground another hoeing, before their foliage be so far advanced as not to allow it to be done with safety. They may be expected to give a moderate crop this season, if the weather is favourable, and will require no other culture in future than what has been already stated; keeping clean of weeds in summer, and dressing in spring.

The advantages of this practice are these: All the sap that was prepared in the leaves is thus allowed to be deposited in the buds for the production of the next year's crop: the runners and foliage protect the plants from the inclemency of winter, by their falling down as a covering for that purpose: and, lastly, in ground where the plants

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fruit, in peach-houses or vineries, have not an opportunity of taking root in the soil, except a few which may chance to fix themselves in some of the neighbouring pots. Consequently they must draw all their support from the parent. It is observable, that the young plant never fixes itself till its parent has pushed it forward to its utmost limits, which is known by the connecting runner being always in a straight line, if it meet with no obstruction, which, was it to extend in length after the young plant fixed itself, would make it form a curve, more or less, according to the length it grew.

are liable to be thrown out by frost, it prevents it, by the whole being, as it were, an entire piece of network, which consequently must rise in a mass.

An objection may be made; If the rows are not to be dug between, how are they to be manured, as they generally are allowed to remain a number of years in the same place? In answer to which it has been said, they should be planted in good, rich ground, which may be supposed to produce several crops before it is exhausted. But where it may be necessary to apply manure, it should be given in a liquid form. The drainings of a dunghil are excellent, and may be given any time in winter, if the weather is open, or in spring. Pigeon-dung makes a very good manure, when so slightly pointed or forked in as not to disturb the roots, at the time the plants get their spring dressing; the good effects of which will soon be visible from the dark colour of their foliage.

But the most effectual method to have strawberries vigorous and fruitful, is not to allow them to remain too long in one place. The period will vary according to the soil. In light, sandy soils, they will not stand good near so long as in deep loam; in the one they will do little more good after the third crop, and in the other after the fifth. Or the first, they are at their best the second crop; on the other the third; after those periods at an average, the produce will decline on both.

The Hautbois and Chili kinds are exceptions to this, as they will continue a year or two longer in vigour, according to the soils they are planted in. Therefore, to have strawberries in the greatest perfection, a quantity should be planted every spring, in proportion to the soil they grow upon. That is, on light soils a third, and heavier soils a fifth part, trenching or digging up the same quantity after the crop is gathered. But the proportions to be planted or dug up annually, will be best understood by the person who has the management of them, as he will be the best judge at what time the deterioration of their produce commences, which, in some sorts and situations, will be sooner, and in others later, as above hinted, after which period no art will bring them to their former fruitfulness; but the crop will continue to grow worse and worse every year, the plants losing that energetic power for the production of fruit they possessed when they were young, and appearing to expend their strength on a luxuriance of foliage*.

* The following may probably be the cause. Every bud that is formed, either upon the plant itself, or upon the runners, throws out radicles. These striking into the ground, draw additional nourishment for its support, besides what it may receive from its primary roots. But when an elongation of the plant takes place, which is the case in a few years, the buds which are situate upon the top of the plant, although they invariably emit radicles in quest of food, are, from their elevation, unable to reach the ground. Hence they wither and die

By these means there will always be a healthful stock of different ages, in regular succession, which will produce plentiful crops in ordinary seasons; consequently require less ground for the supply of a family, and give greater satisfaction to their owner, as well as to the person who has the charge of them.

The strawberry season may be continued from the time they ripen in the open gound, till they are destroyed by the frost in autumn, by planting a few of the various kinds in different situations; a practice familiar to every professional man, and which need not here be detailed farther, than to mention that they may be arranged in the following manner. The Scarlet or Virginian, and some others, ripen nearly together, which make the first crop. These are succeeded by the Hautbois, and the different varieties of Chili, &c. Then the Wood and Alpine sorts continue the succession; and by planting a few of the true Alpine Strawberry in spring, in a warm situation, these being protected

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off, without fulfilling the intentions of nature, and the plants being deprived of their secondary support, the deterioration of their produce naturally follows. Any person may satisfy himself of the truth of this by inspection. In young plants the radicles of the different years will be visible in distinct series one above the other. While on the old plants, which are considerably advanced in height, there is none above the surface of the soil, excepting those of the present year, twisted and warped amongst the axillæ of the foliage in search of food, which are destroyed in the course of the following winter.

in autumn from slight frosts, will continue to give a dish as long as the weather remains open. As these are meant to stand only one season, for the production of a temporary crop, they may be planted considerably thicker than ordinary; which would give protection to a greater number of plants on the same space of ground.

These hints must be known to many, and may induce others to turn their attention towards improving the culture of one of the finest and earliest fruits of the season.

KIPPENROSS,
March 3. 1818.

XXV.

On the culture and management of the Citrus tribe, the Camellia Japonica, Thea, and the Ericæ.

By Mr Walter Henderson, Gardener, Woodhall.

(Read 5th December 1822.*)*

The extensive collection at Woodhall (the seat of Walter Frederick Campbell, of Shawfield and Islay, Esq. M. P.) of plants belonging to the genera Citrus, Camellia, Thea and Erica, having attracted the notice of different Members of the Caledonian Horticultural Society, I now proceed, at their request, to lay before the Society an account of the mode of culture and management which I pursue. Being unaccustomed to write for the press, only a very plain statement can be expected; but it may be depended on as the result of between thirty and forty years experience.

Citrus tribe.

The *compost* which I have found most advantageous for the growing of orange-trees, may be

prepared by adhering to the following directions. Take one part of light brown mould from a piece of ground that has not been cropped nor manured for many years; one part of peat-earth, such as is used for growing heaths; two parts of river-sand, or pit-sand if it be free from mineral substances; and one part of rotted hot-bed dung; with one part of rotted leaves of trees. Mix them all well together, so as to form a compost soil of uniform quality.

When orange plants require to be shifted, the best season for this operation is about the beginning of March. Having turned the plants out of the pots or tubs, pick as much of the old exhausted mould from the ball as you can, without injuring the roots. They should be shifted into pots or tubs only one size larger, and some of the plants will perhaps do better if replaced into the same pots again; for I have always found that the Citrus tribe, and plants in general, grow best in pots regarded as rather small in proportion to the size of the plants. Let the pots, however, be all clean washed and dried, before any plants be again put into them. Put a piece of crockery or broken pot over the hole in the bottom of the pot, with the convex side down; then cover the bottom, above the piece laid over the hole, three quarters of an inch thick, with char made from pit-coal, broken small about the size of peas. This both forms a drain, and prevents the entrance of

worms. On the top of the charred cinders place a layer of dried moss or hypnum, which prevents the compost mould from getting down amongst the char, and lets the water pass off freely from the roots of the plants. The bottoms of the pots being prepared in this way, put in a little of the compost; then introduce the roots of the plant into the pot, and fill it up with the compost, observing to keep a little of the mould betwixt the side of the pot and the roots.

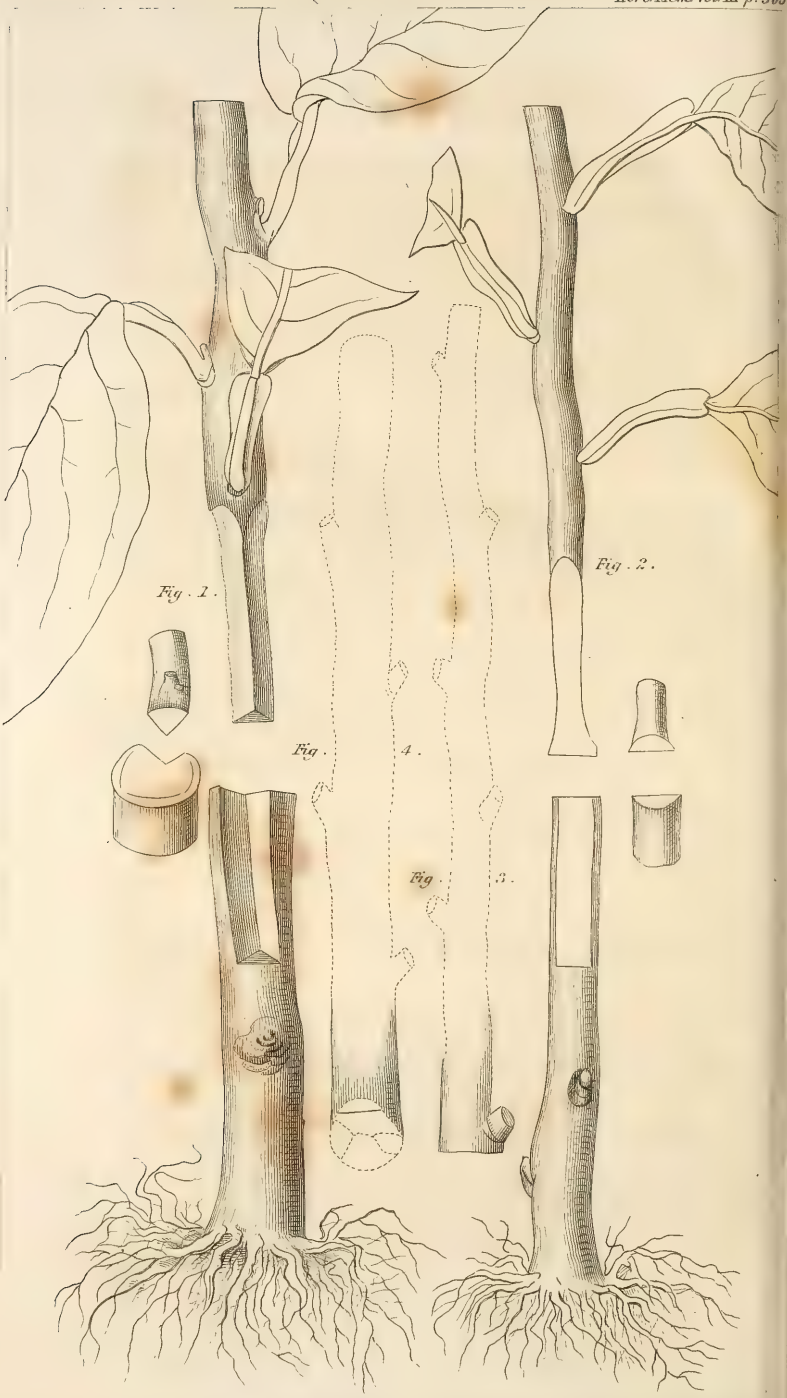
The plants may be set partly into the peach-house or the vinery, and some into the greenhouse, which will give a longer succession of their flowers. The orange-trees that are placed in the vinery or peach-house, if there be any fire-heat used at the time, must be watered as soon as put in; but those put into the greenhouse, where there is little heat, may stand a day without getting any. After that space they may get a moderate watering; and this may be repeated once a week till the weather become warm, when they will require it oftener. Those placed in the vinery or peach-house will require watering very frequently, according to the degree of heat kept up in the house.

The general management of the orange-trees, from the middle of March till the 1st of October, may be discussed in a few words. I give the trees a good watering all over the leaves once a week with the engine, excepting when they are in flower. Till the end of May, this watering is given

about 11 o'clock forenoon. After the end of May, I give them a good dashing over the leaves twice a week with the engine; and now I do it in the evening. In very hot weather I repeat the engine-watering thrice a week.

I never set the orange-trees out of doors during summer; for, from thirty-eight years experience, I find it is much against them, in the climate of Scotland. In hot weather, I keep them in the back of the vinery, under the shade of the vines, or behind the stage of the greenhouse. Orange-trees delight to be in the shade in sunny weather; they here grow freely, and keep a fine dark green colour. From the frequent waterings over the leaves in summer, the pots require less water, but they must be carefully attended to; and when the plants are making their young shoots, the pots or tubs require a good supply of water. From October to March, I give them a gentle sprinkling over the leaves once in two or three weeks, but only in fresh weather, taking the opportunity of a mild day, when there is a little sun, and always in the forenoon.

I only shift orange-trees once in two years, and frequently after a longer interval. I never shift any plant till the pot is very full of roots. In shifting the oranges, I always take as much of the exhausted mould away as I can; and, on account of the light and free nature of the compost used, it comes easily from among the roots.



P. Syme Del.r

W.H. Lizars Sculp.t

The common way of propagating the Citrus tribe, is budding or grafting on stocks raised from seeds. Grafting is the quickest way of getting the plants to some size. If there be any stocks that have not been wrought, about the first of March, take some two-year old shoots from plants of the kind which you wish to have upon the stocks. These may be put on in the common way of grafting, or in the way I have practised for a number of years with success, examples of which are given in the plate. (Plate IV. fig. 1. and 2.)

Take two-year old wood, cut into lengths of about seven inches. If the stock is much thicker than the graft, as in fig. 1., cut a piece out of the stock of a triangular figure, about an inch and two-eighths in length, regulating the depth according to the thickness of the graft, and keeping it square at the bottom. Displace two leaves at the bottom of the graft, for the convenience of getting it put on: cut the graft right across under an eye, where a leaf has been taken off: dress the graft to fit the receptacle made in the stock, observing to keep the lower end of the graft equal in thickness as above: always let three or four leaves remain untouched on the graft. After the graft is fitted in the stock, tie it up with bass-matting, and put clay around it. If the grafts and stocks are nearly of the same thickness, as in fig. 2., cut the stock, at right angles, nearly half through. Cut off the piece, keeping it equal at top and bottom: cut the lower

end of the graft right across under an eye, as in fig. 1., and with the knife prepare the graft to fit the stock. When the grafted plants are tied up and clayed, set them in the back of the vinery or peach-house, observing to keep them away from the flues, as fire-heat is hurtful to them at first: cover them with hand-glasses, or if a frame can be spared, it is still better. Shade them every day, but take the mats off at night; continue the shading till they begin to grow, when they may be exposed to the light. If any stock happen to be so tall and thick that it cannot be placed under a hand-glass or frame, put two or three grafts on it, set it in any convenient place in the house, and shade it with mats; it will succeed perfectly in this way. The grafts lose none of the old leaves; and, in five or six months, they will make three or four young shoots six or eight inches long: these, with the leaves that were on the grafts when put on, form a well clothed little plant.

But I have for many years past propagated all the Citrus tribe, by means of *cuttings*, which is by far the quickest way of getting plants. It is thirty-seven years past in the month of August, since I first propagated a number of oranges from cuttings, having tried several experiments previous to that which then induced me to try it on somewhat a larger scale. From the plants I then had, I cut off most of the young shoots which they had made during the three preceding months. These shoots were

then quite firm in the wood. I also had a quantity of shoots of the same age, but of species and varieties different from mine, sent me by a friend at a considerable distance from this, under the name of grafts. I put the cuttings into ten pots, and set them in a one-light box or frame, in which I had raised my cucumbers and melon plants. There was no heat in it. I gave the pots a moderate watering, and covered the glass with a double mat, which completely excluded the light from the cuttings. They there stood till the middle of November, having occasionally got gentle waterings from the time they were first put into the frame. The frost at this time set in severe, so that I was obliged to move the orange cuttings into an early peach-house, which I had just shut up. There was a pit in the house, which was filled with leaves. I plunged the pots into these leaves, and covered four of them with a hand-glass. The leaves acquired a fine moderate heat. On the 30th of December I examined one of the pots, and found it completely matted with roots. It was with difficulty that the plants could be separated without breaking their tender roots. I potted off 120, which were all well rooted, and yet had made no growth at the top; for this they never do till after they are well rooted. These 120 I plunged again into the pit filled with leaves. I covered them with a smaller frame, and shaded them, when there was any sun. They remained in this frame for five weeks, when they

were well taken with the pots. They were then removed, and set on the kirb of the peach-house. Here they remained till the beginning of May, when they were plunged amongst coal-ashes, and covered with a frame, out of doors. They were kept in this frame all the summer; and in six months from repotting, they were fine bushy plants. A number of these little plants produced flowers before they began to make their summer shoots. These flowers had been formed in the shoots before they were taken off the mother plants. They were plunged in the coal-ashes to prevent worms from entering the pots, which are hurtful to the plants.

To prepare cuttings of the Citrus tribe, therefore, as shown in Plate IV. figs. 3. and 4, take the strongest young shoots, and also a quantity of the two-year old shoots; these may be cut into lengths from nine inches to eighteen inches. Take the leaves off the lower part of each cutting to the extent of *about five inches*, allowing the leaves above that to remain untouched: then cut right across, under an eye; and make a small incision in an angular direction on the bottom of the cutting, as represented in the engraving. When the cuttings are thus prepared, take a flower pot, and fill it with sand; size the cuttings, so that the short ones may be all together, and those that are taller in a different pot. Then, with a small dibble, plant them about five inches deep in the sand, and give them

a good watering over head, to settle the sand about them. Let them stand a day or two in a shady place, and if a frame be ready with bottom heat, plunge the pots to the brim. Shade them well with a double mat, which may remain till they have struck root; when rooted, take the sand and cuttings out of the pot, and plant them into single pots, in the compost already described. Plunge the pots with the young plants again into a frame, and shade them for four or five weeks, or till they are taken with the pots, when they may be gradually exposed to the light. The cuttings are shown in fig. 3. and 4. without the leaves, merely for the conveniency of the engraver; but the leaves should be all left untouched, except those that are taken off the lower part of the graft, and the lower end of the cuttings, that is sunk in the sand, as already mentioned.

From various experiments I made afterwards, I found that pieces of two-year old wood struck quite well; and in place, therefore, of putting in cuttings six or eight inches long, I have taken off cuttings from ten inches to two feet long, and struck them with equal success. Although I at first began to put in cuttings only in the month of August, I now put them in at any time of the year, except when the plants are making young wood. By giving them a gentle bottom heat, and covering them with a hand-glass, they will generally strike roots in seven weeks or two months.

The Citron is most easily struck, and is the freest grower. I therefore frequently strike pieces eighteen inches long; and as soon as they are put into single pots, and taken with the pots, they are grafted with other sorts which grow freely. I am not particular as to the time of grafting. I grafted a few about five weeks ago (October 9.) with two-year old wood; and they are all beginning to push freely (November 16.). I have also made two pots of cuttings about a week ago (November 8.): when rooted, I will send one of them to be shewn to the Society. All the different sorts of Citrus thrive well on the Citron stock. The next best stock is formed by the Shaddock. There is an Orange-tree here from a cutting which was put into a pot of sand with some others in January 1809. It was kept in pots of different sizes till January 1817, when it was put into a box nineteen inches wide and eighteen deep, with plenty of holes in the bottom, so as to admit the escape of the roots. A hole was dug in the back of the vinery, which was filled with the compost already mentioned, and the box sunk a little into it. The tree is now more than sixteen feet high, being up to the top of the house, and spreads twenty-seven feet horizontally. There are several shoots on the tree of this summer's growth four feet four inches in length. One remarkable shoot is about seven feet, another above five. I intend to strike some of these shoots. This

is a Maltese Orange-tree; it bears very fine large fruit, juicy, and high flavoured.

The sorts of oranges here, are, two or three varieties of the Bitter; the Maltese sweet Orange; the Blood-Orange, the juice about the colour of Port-wine; the Horn-Orange, which is the largest of the Bitter-Oranges, remarkable for having a little point which stands out on the top of the fruit, and sometimes on the side. There is little difference in the habit of the varieties of the Bitter Oranges. The Sweet Oranges are quite different in their appearance; their leaves are broader and the plants are more erect. I have a tree of the St Michael Orange; it does not differ much from the common Sweet Orange. The Bergamotte Orange is quite distinct from any of the others: the leaves lie all backward; the fruit is of a fine bright colour and high flavour, though of a small size: this is a bitter Orange. The Myrtle-leaved Orange forms a handsome plant, and is a great bearer. The fruit is of a fine high colour and very sweet, but it never grows so large as other sweet oranges.

The Mandarine Orange-tree is very narrow in the leaves, and the wood is small and slender. The fruit comes at the extremity of the last year's shoots; it is of small size and a little flat; the rhind is uncommonly thin, and the juice very sweet. The Tongereon Orange has much the appearance of the mandarine. It differs from it in having

spines on the old wood: I have not yet fruited this sort. The common Lemon-tree succeeds well; it is a great bearer, and strikes very readily from cuttings. A tree on the back of the greenhouse behind the stage has not been without fruit for several years. At all seasons it presents ripe lemons of a fine size and colour: indeed there are in general three crops on the plant at once, in successive stages of advancement. There is a bitter orange next to it in the same situation, and treated in a similar way. This plant is also generally covered with ripe and with green fruit. These trees have no heat, except a fire put on in very severe weather, to keep out the frost. The Lime is smaller in the leaves than the Lemon, as also in the fruit, which is of a handsome oval shape. When the fruit is ripe, it is of a pale yellow colour. The Citron is a hardy strong growing plant: the leaves are punctated like those of the Lemon, but much larger. I have had these leaves thirteen inches long, and seven and a half inches broad. The Citron-tree is a great bearer, and soon spreads wide. One tree here covers the back of a late vinery to the extent of fourteen feet four inches high, and eighteen feet six inches horizontal: this tree was produced from a cutting. It is never without fruit: the fruit when ripe is the colour of the lemon, and also nearly the same shape. It becomes very large, few of them under two pounds; often three and a half pounds; and once or twice I have produced them four pounds. The acid

is rather stronger than that of the lemon: it has been long and much esteemed here for a preserve, both in the green and ripe state.

The Shaddock-tree possesses the handsomest leaf of the whole tribe. In shape it is the same as that of the Orange, but much larger, and of a fine glossy green colour. The fruit resembles the orange, only it is flatter and much larger. When the fruit is ripe, after the rhind is taken off, there is found a covering round the pulp three quarters of an inch thick, of the consistency of a *foggy* turnip, and much the same colour. When highly ripened, this pulp of the Shaddock appears like an orange after the rhind is taken off it, and eats nearly as a sweet orange. Both the Citron and Shaddock tree yield flowers very freely, producing spikes of them at the extremities of the shoots a foot and fourteen inches long; they are highly fragrant, and perfume the whole house. The Forbidden Fruit is a variety betwixt the Orange and Shaddock: the leaf smaller and not so handsome; the flowers are nearly similar. I have not yet fruited this variety.

I have got a small orange plant a few months ago from a friend, of a kind newly imported from China, and hitherto unknown in this country. The leaves are small and rounder than in any of the other varieties. The plant indeed has quite a different aspect from any other of the Citrus tribe I have seen. The fruit is said to be fine.

I treat all the different varieties of Citrus in the same way as formerly described. When the plants are young, they are the better of a little heat; but after they are two or three feet high, they will flower and fruit well in a common greenhouse.

It is well known that different species of insects attack the Citrus tribe. I shall mention some of these, with the methods I employ for destroying them. The Aphis or green-fly is the most numerous insect in hot-houses and greenhouses, being a native insect. It frequently attacks the Citrus tribe, when they begin to make their young shoots, and would soon either destroy them, or make the plants very unsightly. The aphis is easily destroyed by fumigating the house with tobacco; but this requires to be repeated frequently to keep them under. They may also be destroyed, by dipping the shoots in an infusion of tobacco. The Acarus or Red Spider, is a kind of plague to almost every kind of plant. A dry heat will soon bring these red spiders in great numbers. I have often seen orange trees quite spoiled with them; but if the trees are dashed with water from the engine as directed, the spider will never do any hurt. I keep them completely under by sprinkling and dashing. The acarus is also a native insect, and plenty of them are to be seen in the woods in the droughts of summer, particularly on the leaves of

the Viola canina. The Coccus or brown scaly insect is also a pest to the Citrus tribe, and particularly if they are not growing freely. They are easily destroyed by laying upon the leaves with a brush some black soap dissolved in water. Flowers of sulphur also form a complete remedy. Sprinkle the tree with water, and put the flowers of sulphur into a drudge-box, and dust the shoots where these insects are. I always prefer black soap, on account of the sulphur giving a disagreeable smell to the house. The coccus is I believe originally from a warmer climate than ours. There is one more insect that I have also seen on the Citrus tribe, which is the Thrips, but it is not so hurtful to the Citrus as to thinner-leaved plants: it is very generally seen on forced French beans. I have never had it on the orange trees here. Sprinkling the trees with water as formerly directed, is a complete preventive against the red spider and thrips. The thrips is a native insect, and I have seen the bean crop in the fields some years very much injured by it. It is excessively small, conceals itself along the veins of the leaves, and in general escapes notice, so that I have generally heard its ravages imputed to something else.

Camellia Japonica.

I now proceed to give some account of my method of cultivating the Camellia Japonica.

The compost may be prepared in this manner.

Take one part of light brown mould, the same as formerly mentioned for the Citrus tribe;

One part of river-sand;

One part of peat-earth;

One half part of rotted leaves.

Mix them all well together, and when the Camellias require shifting, put some broken coal-char in the bottoms of the pots and some dry moss or hypnum over it, as in shifting orange trees.

The best time for a regular shifting of the Camellias, is the month of February or beginning of March. After shifting all those that require it, put them into the peach-house or vinery, where there is a little heat; if there be no peach-house, vinery, nor pinery, set them in the warmest part of the greenhouse. They will soon begin to make young wood. From the time they begin to make their young shoots, till they have finished their growth, give them plenty of water. They may be kept in the vinery or peach-house till they have formed their flower-buds at the extremity and sides of the young growths, when a few of them may be removed to a colder place, say behind the stage of the greenhouse; for the Camellias are fond of being shaded during strong sunshine. In three or four weeks after, a few more of the Camellias may be brought from the vinery or peach-house, and put into a colder situation. This may be repeated three or four times,

which will make as many different successions of flowering. Those that are wanted to come into flower early, may remain in the warm house till they are beginning to flower, when they should be taken to a cold place, say the coldest place of the greenhouse ; then give them plenty of light only, and they will open their flowers well and stand long. A Camellia cannot stand heat when in flower ; indeed, they seldom open their flowers fine when in heat, and, at all events, the flowers soon fall off. Those that are kept all the summer in the vinery, will come into flower by the first or middle of October ; and a pretty large plant, having perhaps fifty or a hundred flower-buds, will continue in flower till the month of January. Those plants that were removed early from the vinery, will now be in flower, to succeed those that were in flower in October, and have now done flowering. These last should be immediately taken into the heat. They will make their young wood early, and they may remain in heat till they come into flower, which will perhaps be a month earlier next year. By attending to shifting the Camellia plants from the warm house to the cold, a regular succession of flowers may thus be had from the first of October to the middle of July. I have even had them all the summer, but the flowers are best in the winter. Those produced in summer are far from being so fine, and do not stand half the time of those that come into

flower in November, December, January, February, March and April. Camellias delight to be kept damp all the summer months, and a little shaded from the strong suns. Give them plenty of water while they are making their young shoots. They may also get a gentle sprinkling over the leaves once every week during the summer season, except when they are in flower. Camellias will stand a great deal of cold without being much injured, but they will not form many flower-buds without some artificial heat. I find they flower best when kept in rather small pots or tubs. I never shift them but once in two years, or often once in three years. There are several very large Camellias here that have not been shifted these five years, and they are still in high health, having always produced above a hundred fine large flowers every year. Six years ago, I shifted a single Camellia from a twelve inch pot into a tub seventeen inches wide by seventeen deep, and grafted it with two different sorts of double red, one double striped, and one double white: it is still in the same tub, and all the four sorts in high health. I have had all the four sorts in flower at once on it, producing a fine contrast of colours. The plant is large and handsome, being eight feet six inches high, and six feet nine inches wide. There is another plant here, twelve feet high, having upon it all the sorts I possess. They were only grafted last summer, and a number of the sorts are shew-

ing flowers; grafts of all of them have taken, and are growing well. The plant is growing in a box sixteen inches over, by sixteen inches deep. The single red Camellia is generally struck from cuttings or layers; and after these cuttings or layers are established in pots, they are budded or grafted with the different sorts of double flowering Camellias.

Cuttings of Camellias may be put in at any time of the year, except when they are making their young wood. Fill the flower-pot full of small river or pit sand. Put no drainer in the bottom of the pot, only a piece of broken pot to prevent the sand from running out. Take off a quantity of young shoots, removing the lower leaves, and observing always to cut the bottom of the cutting close to a joint. Fifty cuttings may be put in a pot of eight inches diameter. After they are put in, give them a good watering, to settle the sand about them. Set them into a cool and shady place in the back of the vinery or peach-house, where they may stand for a month or six weeks. Indeed, they will strike roots in this situation; but if there be any room in a hot-bed frame, where there is a little bottom heat, plunge the pot to the brim in it; cover the glass with a mat to prevent the light from getting in: they will very soon strike roots in this situation. As soon as they are rooted, put the plants into single small pots; plunge the pots again, and cover

them with a frame or hand-glass; shade them with a mat for some time. As soon as they are taken with the pots they may be exposed to the light, and set in the vinery, peach-house or green-house. When they get large enough, they may be grafted or inarched. If grafted, they should be covered with hand-glasses, or set in a small frame, and shaded till the grafts have taken, when they may be exposed to the light by degrees.

The double flowering Camellias will also strike from cuttings. Put the cuttings in pots of sand, in the same way as directed for the single. Such cuttings flower when of very small size. I have frequently put in cuttings of the double sorts in the end of April. As soon as they were rooted I have potted them off into very small pots, and I have had them in flower in the month of January following. Some of these little plants had only three leaves, and yet produced some one, some two, and others three, full sized handsome flowers. These cuttings were no larger than when they were cut from the mother plant; the flowers, of course, had been formed in the cuttings before they were taken off. Camellias, like orange trees, make no growths till they have furnished themselves with good roots, and these Camellias that flowered so small, made no wood till after they had done flowering. I struck upwards of sixty double ones, which were put in pots of sand in the end of April 1821. Most of them produced flowers in

very small pots in January 1822. As soon as these had done flowering, I shifted them into larger pots; some of them are coming into flower again just now (November 1822) and have six strong flower-buds on them, although the plants are still very small.

The sorts of Camellia here are as follows :

1. The common Single Red.
2. The Long-leaved Red, also single.
3. The Single White.
4. Double White.
5. Double Red.
6. New Red Double.
7. Double Striped.
8. Red Waratah.
9. White Waratah.
10. Pœonia-flowered.
11. Red Blush.
12. Midlemist's Blush.
13. Lady Hume's Blush, a very handsome flower.
14. Myrtle-leaved.
15. Atro-rubens.
16. Sesanqua.
17. Semi-double.
18. Hexagona, said to be very fine.

I have not flowered this last sort yet, but all the others I have often flowered. The single Camellias produce seeds regularly with me; and I have several plants raised from the seeds, which appear different in the leaves from the common; but

none of these have yet flowered, although the plants are of a considerable size.

There are few plants so little attacked by insects as the Camellias. I have never had the Green Fly or the Red Spider on the Camellias here. I have seen a small white scale on the bottom of the flower-buds and leaf-buds in some collections; but I have never had the scale here, except on a very few plants, and I got clear of it by washing the buds with soap and water. The Camellias at Woodhall are just now free from every species of insect.

Thea.

The Camellia and the Thea are, I think, very nearly allied. The Thea grows freely on the Camellia stock. The Tea-tree seeds here regularly; and they both bear their seeds in the same way. Indeed, the seeds of the Thea and the seeds of the Camellia cannot be distinguished from one another.

The Theas require the same compost as the Camellias, but do not require to be put into any heat; the coldest greenhouse being sufficient for them, where they will thrive and produce abundance of flowers and seeds yearly. They are handsome plants, and, from the vast quantities of flowers they produce, are well deserving of a place in the greenhouse. They are, like the Camellias, fond of a little shade in hot weather; I never set them out of the green-house during summer.

I have never had any insect on them. I strike them in the same way as the Camellia. They will stand a great deal of cold, but without the shelter of the greenhouse they produce few flowers.

Erica.

I now go on, in the last place, to give some account of the culture and management of the Erica tribe.

There are now a very great number of beautiful species and varieties of Erica in this country, which have at first been raised from seeds brought from the Cape of Good Hope. Few of the Cape Ericas produce seeds in this country. They are, therefore multiplied by striking them from cuttings. The month of July is a good time for puting in most of these cuttings, but the cuttings must not be taken off till the young wood be firm. Cuttings of Ericas may be put in at any time when the wood is in a proper state. Take the cuttings off the plants about three quarters of an inch long, pulling them off downwards; strip off the leaves nearly half the length of the cuttings; place the cutting on the nail of the thumb, and, with a sharp knife, at right angles, cut off the small end close to the joint, or place where it was pulled off the plant. Having done this, plant them into a pot filled with small pit or river sand, giving them a good watering to settle the sand about them. Set them on a shelf where they are a little shaded;

cover them with glasses, and notice to keep the sand always moist. Some of these sorts will be well rooted in three months, and others will require six months. Get a quantity of fine surface-peat earth from the moors, and if it can be got with a quantity of white sand amongst it so much the better, but if it cannot be got of this quality, add plenty of river sand to it. I have tried them in this way many years ago, and found them grow well and flower delightfully. In taking the earth from the moor, observe to take it from the surface, not going above five or six inches deep, and it would be better to be collected and laid in a heap twelve months before it is used. The same thing may be said of light-brown mould and peat earth for the Orange-trees and Camellias; but when I first began to grow Oranges, Camellias, and Ericas, I had none of these earths or composts prepared. I just went to the fields and collected them, and brought them home, and used them for the plants immediately; the plants put into this newly collected compost grew perfectly well and flowered well: I frequently do this still with the Oranges and Camellias. I merely mention this to prevent people who may have these plants, from despairing of succeeding with them from not having a quantity of the compost laid up twelve months previous to the time they require it to shift the plants into.

Having got a quantity of sandy peat-earth, or

soft peat-earth mixed with river sand, take small pots; break some pieces of old flower-pots or tiles small; put a little into the bottom of each pot, with a piece of the same over the hole in the bottom of the pot; cover the drainer with a little dry moss or hypnum; put one of the rooted cuttings into each pot, and fill it with the peat-earth, firming the whole gently with the fingers. If a small frame can be got, or a few hand glasses, lay some sifted coal-ashes on the place where you set the pots; cover them with the frame, or hand glasses; shade them with mats in the day time for three weeks, but take the mats always off at night. The plants may now be exposed to the light, observing always to give them air through the day, particularly when the sun shines, minding to supply them regularly with water. If potted off in April, these plants will grow to a considerable size during the summer. Many of the Ericas are apt to spindle away, and grow tall and slender. To prevent this, top them as soon as they begin to push: this will make them form several young shoots, and keep the plants low and bushy. Let the plants stand in their first situation till the first week of October, when they should be brought into the house, and set on a shelf, where there is no fire heat near them; at this time they should be regularly watered. When the heavy rains and frosts sets in, they will require a little fire heat, and when the weather is mild, with a little sun,

give them all the air you can. Several of these little plants will begin to flower in April, or sooner. About the end of May, all those that require it should be shifted into pots a size larger; and about the 10th or 12th of June set them all out of doors, and cover them with a frame, previously laying the place with sifted coal-ashes. Some of those that did not require shifting when the larger were shifted, will require it during the summer. Take care to give them plenty of air, and regular watering when they require it. These plants may be again set into the green-house, or hot-house, about the end of September: many of these will flower about this time, and what do not flower betwixt this time and the middle of December, will flower in March, April and May following. All those that require it may again be shifted, and in ten days afterwards set out of doors, in a rather shady situation, where they may remain for two or three weeks; after which, they may be set in the full sun, where they may again remain till the last week of September, when they should be put into the house. Give them plenty of air at all times: when there is no frost, set the glass open, and let the wind blow on them; use no fire except in the time of frost. They, by being kept in this way, will be hardy, healthy and bushy, and produce their flowers strong, and in great quantities. By treating the plants from the cutting in this way, they have a fine appearance, but if neglected at

the first, many of them are weak and ill furnished, and will never make good plants. The plants will now be a good size, and many of them will not require shifting every season. Never shift any plant till the pot is quite full of roots. This may be easily ascertained by turning out the bole on your hand, and seeing the roots: this will do no harm if done with care: it is very hurtful to shift until they are in want of it. When the plants get large several of them will continue in good health for three or four years without shifting, and flower well. I have plants of Erica retorta here in pots seven inches diameter, which are very bushy, being eighteen inches across, and fourteen inches high above the pot; Erica infundibuliformis, two and a half feet diameter, two feet nine inches high; Erica pilosa betwixt five and six feet high, and three feet across, in pots eleven inches diameter: these have not been shifted for five years, and are in high health, and covered with strong fine flowers from the mouth of the pot to the top of the plant.

The Ericas are not subject to insects. I have never had any insect on them except the Green Fly. The old Grandiflora is the only one with me that has been attacked. I destroyed the flies by dipping the plant into an infusion of tobacco. The Ericas, I find, do not agree well with being smoked with tobacco-paper in the usual way.

XXVI.

On the Destruction of the Moth that infests Fruit-Trees.

By Mr Pemberton Musgrave, Gardener, Mayfield.

(Read 13th March 1823.)

The destruction of the insect which infests fruit-trees, is a subject which has engaged the attention of many ingenious men, who have from time to time proposed various methods of getting rid of this formidable enemy; but as none of them seem ever to have fully realized this object, I humbly offer the plan I have adopted for this purpose to the consideration of the Horticultural Society. My plan is one which I never knew practised before, and it has had the effect of almost completely clearing the trees of vermin. It is as follows.

I examine the trees I wish to clear, in the beginning of June, that being the time the insects begin to leave the chrysalis state. When I find one of these of a dark colour, I am aware the insect will make its appearance in the course of a few days. That

chrysalis I examine daily until the insect comes out, and although I do not see the insect emerging from the shell, yet I am sure to find it in the neighbourhood of the covering which it has left, exhausted with fatigue in consequence of the exertion it has made in extricating itself from confinement. At first I put a few of the chrysalids into paper bags, which gave me an opportunity of examining them minutely. I also watched some of the chrysalids of the bore-worm, which causes gooseberries to fall off in great quantities by boring into the berry, and I found that fly to be of the same class with those which infest the apple, pear, and cherry trees. I was also able to prove decidedly, that the females come into existence full of the rudiments of eggs, which I found by dissecting several of them, and examining the ovarium. I also found, by carefully noticing every insect which I caught, that the greater number were females.

After I had thus made myself completely acquainted with the enemy with which I had to contend, I continued my labours, going over a number of wall-trees which I fixed upon for the experiment, with a branch of a willow tree in my hand, with which I switched the leaves and branches, for it is amongst the leaves and branches of the trees the insect secretes itself; but in order that it may be done with more expedition and success, I would recommend a birch-besom to be used in preference. Al-

though I did not ask or wish for any assistance while the experiment was going on; yet it will be proper that there be two persons, one to go over the leaves and branches of the trees, in order to make the insect leave its retreat, and one with a net attached to a pole to catch the fly, or to destroy it if it should alight on the ground, as it will be apt to do, if the day is clear and sunny, for these insects cannot bear the bright rays of the sun, which is the cause of their remaining amongst the leaves during the day; but should the day be dull, the net will be highly necessary to catch the insect, as it will then likely fly to some distance before it alights. This operation must be continued until all the insects are destroyed; but it is not needful that it should be performed every day, but every other day, as the insects are some days from the chrysalid state before they are ready to deposit their ova, which is done during night.

As I have only been speaking of the method I take with wall trees, I shall also state the method I follow with standards. The time for going over them is generally two or three weeks later than the wall trees. It is a singular fact, that the insect keeps pace with the leafing of the tree. With the standards nothing will be required but the net, as the branches can be gently shaken, which is sufficient to cause the fly to leave its nestling-place; but as it might be the means of bringing too many down

at one time, if the tree was shaken all at once, care must be taken to shake the branches one by one. Where the trees are lofty, a pole with a hook attached to the end may be used.

The net used is made of strong black gause, that colour being best for the purpose. It is a yard and a half in circumference, a foot deep, and attached to a whalebone rim. The handle is made of common wood, about a yard and half long, which length I found most convenient; but that can be increased or diminished as individuals may think proper. With regard to the manner in which it should be used, all I have to say is, that I kept the net in my right hand; and the moment an insect was driven from its place, I swung the net in the direction opposite to that in which it flew. If I missed in the first attempt, the second generally succeeded.

This plan of destroying these moths, has succeeded equal to my expectations; indeed it carries conviction on the face of it. It is not only simple and can be performed at very little expence, but it is sure, and can be acted upon in the most extensive orchards.

As it has often been said, if I may be allowed to reason from analogy, that he who kills the weeds in his garden before they can injure his crop, or deposit seeds in the ground for the production of a new race, is acting upon the most rational principle, so must that method be preferable

to all others, by which insects can be destroyed before they can possibly deposit their ova in and about the tree, for the production of a new progeny, particularly as the idea of insects coming in the east wind, engendered in the haze, is completely exploded. When we consider the great number of eggs one destroys by killing a single female in the beginning of the season, the utility of the plan I think will at once appear. Supposing, then, that any person, by going over twenty or thirty trees each day, which can be done easily in a few hours, kill 200 insects, and, for a very moderate calculation, suppose the one-half of them females, allowing only 100 eggs to each, there will be no fewer than 10,000 eggs destroyed or prevented. If the operation be carried on for a month only, every alternate day over this number of trees, the amount of eggs destroyed will be 150,000. This is actually what I have done myself: There is surely, then, very little reflection necessary, to convince any unprejudiced person, that, by following the same plan, he might soon be able to bid defiance to such a formidable foe. When we also take into consideration, how much the success of the crop depends upon an uninjured foliage, and a free and strong expansion of blossom, the propriety of adopting this method must be obvious: hitherto all the plans of liming, oiling, peeling, &c. have failed.

In the spring of 1822 I observed that these insects

deposit a part of their ova even in the buds: I found several larvæ emerging from under the strong case which protects the bud. As the blossom shoots up, and gives the insect more room, it comes forward and eats a passage into the centre of the blossom, and there it remains until the whole is destroyed; then it goes to the leaves, and they are sacrificed in their turn.

Nature seems to have given this insect a remarkable property, in order to make provision for any loss that may take place by the severity of the weather, at the time the trees are in blossom: —I have observed a new race come forward when the wood-buds begin to expand into foliage. There is another circumstance which, I think, goes to prove what I have now asserted, which is, when a scion, or graft, has been put upon a stock, that stock and scion remain in a seemingly dormant state, until the trees have been in blossom and full foliage for some weeks. No larvæ ever shew themselves upon the buds of the scion until they begin to push into foliage, and then they appear. Knowing all this to be true, how could liming, peeling, or oiling be performed with effect, without the risk of the cure being worse than the disease?

I have just one other remark to make, that it is a too common practice amongst gardeners to destroy, without discrimination, the birds which frequent their gardens. This, in my opinion, is bad

policy. Although I am aware some of the kinds of birds are great enemies to some crops, it certainly must be a trifling crop indeed, that will not bear the expence of a person to watch it, or a net to protect it, until it is out of danger: thus the gardener preserves the birds to perform a double office,—eating up the vermin from the trees, and the seeds of weeds and eggs of insects from the ground. I have often stood and observed the male bird, while the female was sitting upon her eggs or her young, fly to the spot with his bill full of caterpillars to feed his mate or young; and when the young ones become so strong as to accompany their parents in quest of food, it is really astonishing the number of caterpillars they destroy. I can say, from my own observation, that if it was not the case that the birds destroy a vast number of caterpillars, our trees in general would exhibit nothing but bare stumps, for the insects would become as numerous as the locusts of Spain and America. It is from that circumstance that we find so few flies in comparison of the great quantity of caterpillars. I one day followed a nest of young ox-eyes, which had just flown, in order to see how the old ones acted. I saw them fly from branch to branch, and pick from the curled leaves the caterpillars, with which they flew to their young to feed them.

From these considerations, it is my opinion, that, should the gardener, instead of pursuing a sys-

tem of indiscriminate warfare against the feathered tribe, avail himself of the services of these useful allies, he might, with their exertions, and his own united, soon rid himself of those insects that have hitherto set his efforts at defiance.

Specimens of the insect and chrysalis for inspection accompany this paper.

XXVII.

Description of a Pit at Edmondstone, for raising Pine-Apples without Fire-heat.

By Mr JOHN MACNAUGHTON, Gardener.

(Read 5th December 1822.*)*

THE Pine-apple has, for two years past, been fruited at Edmondstone, the seat of JOHN WAUCHOPE, Esq. solely by means of the increased temperature arising from the fermentation of various substances, without fire-heat. The pit contrived for this purpose having met with the approbation of different amateur horticulturists and professional gentlemen, I now, at their request, communicate to the Society a description of it.

A ground plan, and also a section of this pit, will be found in Plate V.

The pit is 18½ feet long, by 6 feet in breadth; the height of the back is 5 feet; the height of the front 3 feet 9 inches; the declivity for the glass 1 foot 3 inches. The pits for the dung are on the outside of the frames, and sunk level with the surface of the earth, or gravel, on the outside. The height of these pits is 3 feet,

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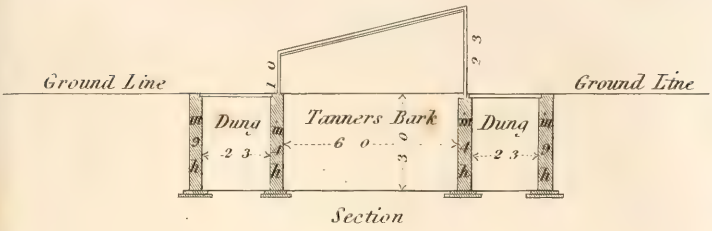
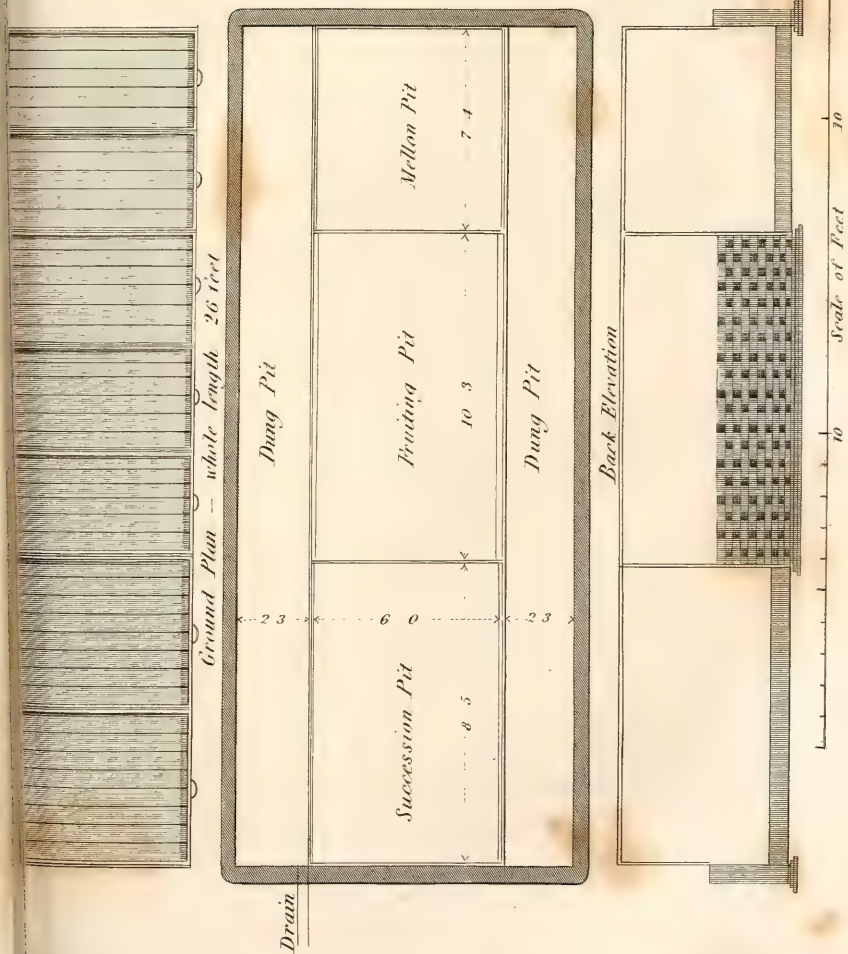
PINE-PITS AT EDMONDSTON





W. H. Lizars sc

their breadth 2 feet. The outside of the pits for the dung is built with 9 inch wall up to the surface, with one course of hewn stone on the top. One inch is cut out for the boards that cover the space allotted for the linings to rest upon : that appearance of litter and dung, which is so offensive in ordinary hot-beds, is thus prevented. The boards that cover the dung are 1 inch thick, by 2 feet 2 inches in breadth. They are of the length of the pit, and have rings at each end for lifting them with. The pits should be well drained, to carry off the under water, and a small grate should be made at the end of them.

The kind of matter which is generally employed to fill the pits, is a mixture of new horse and cow dung : sometimes we use tree-leaves and short grass, which do very well, provided they be duly prepared, by throwing them up in a high heap, to remain eight or ten days, that they may ferment to an equal temperature. Let the heap be turned over once in that time. By mixing the parts together they will work kindly when shaken into the pits. The heat will be steady and lasting, at least for one month. If the heat begins to decrease much, let a part, or the whole, of the dung in the back or front be thrown out and shaken back again, with a little addition of new horse dung, and it will continue as long again; only, let the pits be always kept full up to the boards, and let only one side be shifted at a time, allowing fourteen days between shifting each side of the pits.

The inside of the pit is filled up to within three feet of the glass, with tanners' bark, well dried; for drying is a material thing to be attended to in the winter season. Care must be taken not to let any of the bark fall into the flue, or vacant space that is left for the heat to come up. This will be understood from the model sent to the Society, and the sketch accompanying this paper, (Pl. V.)

I have had the satisfaction to find, after a trial of three years, that this pit keeps to eight or ten degrees of higher temperature than any of the other pits or beds here, although we have them upon four different plans, and all managed with the same attention. Another advantage is, that it answers for melons equally as well as for pine-apples. I planted two plants of the Ionian melon under two lights of this pit, for two years, and they throve exceedingly well: this year the fruit was large, a good crop, and ripe fourteen days before any in the other pits. The weight of the melons in general was from four pounds to four and a half pounds.

It is only five years since I received six pine-crowns from Edinburgh, and from that small number, I have now 268 good ananas plants. In September last, I added eighty crowns and suckers to them in one day, from my own stock; and these have now all struck, and are doing well.

I have tried pine-plants in different kinds of earth, mixed with different kinds of dung, and I believe they will grow quickly, and fruit well in

the following compost of earth and dung; viz. two cart-load of good loamy yellowish-coloured surface earth, or turf if possible; one cart-load of cow-dung, gathered off the grass pastures in the summer season; one large wheelbarrow-full of sheep-dung; one wheelbarrow-full of soot, and a small quantity of bullocks-blood and pigeon-dung. Mix the whole together; throw up in a long heap ridge-ways, in a dry place, open to the sun, and let it lie a year at least before it is used for the pines. It should be turned several times, and broken small, in the course of the year.

I generally shift the pines first in April. Turn them out of their pots, and shake the mould from them, and cut all their fibrous roots off close to the bottom of the stems, (they are last-year crowns and suckers that I mean): take off carefully a few of the bottom leaves, and having the pots ready filled with rich fine mould, plant them in, only about two or three inches deep, and firm the mould about the root with the hand; then plunge the pots to the rims in the tan-pits. In the pit I give them no air till they begin to grow. I then give them a little air, and a little water, about seventy degrees warm. The second shifting is in August. If they are not shewing fruit I shift them to larger pots, with their balls whole, pulling off a few of the bottom leaves, and filling up the vacancy with mould, covering the balls with about an inch of new mould; and leaving about half an inch vacancy over the surface to hold water. If

the tan in the pits be sunk low, or the heat falling, we take all the tan out of the pit, and pass it through a sieve before we use it again; and having about three cart-loads of new tan in readiness, it is mixed and placed in the pits again. If there is any appearance of the tan becoming too warm, the pots ought not to be plunged to their rims at first; and the linings should not be applied at the same time with tan. After the new tan is placed into the pit, it will need very moderate heat in the linings for six weeks or two months, if the tan is good. The pine-apple plants require nothing but a gentle heat at their roots, and the air about their leaves should be at a medium warmth of 70° Fahr. To maintain such a degree of heat with horse and cow dung, or leaves of trees, is no difficult matter; and it is easy to preserve the plants in health and in a fruitful state during the severest winter, by covering the pits with mats in time of frost. In winter, when water by accident falls into the centre of the pine-apple plants, it should be drawn out with a small tin syringe.

I can state with confidence, that the pines produced in this pit ripen their fruit in two years time, from crowns or from suckers, and that the plants always keep clean and healthy. This season, I cut the first ripe fruit on 6th June: I continued them occasionally to 6th November; when I had three still to cut. They weighed from 2 lb. to 3 lb. each, and are of good kinds.

XXVIII.

Account of an easy and expeditious method of preparing Lactucarium or Lettuce-Opium *.

By Francis George Probart, Esq.

(Read 4th December 1823.*)*

Having for several seasons cultivated considerable Plantations of the Common Garden-Lettuce (the Lactuca sativa of Linnæus), for the purpose of obtaining the preparation to which Dr Duncan *sen.* has given the appropriate name of "Lactucarium," and to whom we are indebted for that valuable addition to the Materia Medica, I have the honour to lay before the Society, an account of the process I have found to be the most expeditious and profitable; and which differs materially from the communications they have already received on this subject.

Mr Young of Edinburgh, was, I believe, the first person who prepared lettuce-opium in such quantity as to constitute it an article of commerce; and, if upon a first view, the method followed by

* For this Essay, accompanied by specimens of the Lactucarium, the Society's annual gold medal, for 1823, was awarded to Mr Probart.

that gentleman be recommended by its apparently greater simplicity, I am not without hope that the one I am to explain will discover some advantages not undeserving the consideration of such persons as may henceforth be inclined to the undertaking.

I object to Mr Young's process on account of the extreme waste that attends his commencing to operate so early as when the plants are only a foot high; and because of the necessity he is under to cut off so much of the stem in the first instance, in order to leave a convenient surface for the accumulation of the milky juice, and for the more ready application of the finger; the finger, at the same time, not being equal to clean off all the fluid thus collected on the exposed summit. According to Mr Young's mode, it is, I apprehend, indispensable to commence when the plants are only about a foot above the ground, for, after this time, they begin to throw out branches, which being very numerous, would, I conceive, greatly impede the collection of the juice by means of the finger, and it would be endless to gather it from each of them in the same manner as from the main stem. After my own plan, on the contrary, it is a great matter to encourage, as much as possible, the multiplication of branches, thus increasing the cut surface of the plant, and, consequently, the quantity of product, which, whatever be their number, is collected from every point of exudation with one touch of a calico cloth, as will be explained.

The green coss lettuce seems best adapted to our

purpose, as it is more hardy than others; forms a larger plant, and yields the milky secretion in more abundance, and of better quality: this is, at least, the case with regard to three varieties which I have tried. There is more difference in the quality of juice afforded by the several varieties of the lettuce, than may be imagined: in some of them, it is watery and semitransparent; while that from the green coss is opaque; and so viscid, that, on gently separating the finger and thumb, having a small quantity of it between them, it may be drawn out into a thread-like body of some length. The simple observation of this fact has always afforded me a pretty steady criterion, by which to judge of the vigour of my plants; for the white juice is much influenced by the nature of the season, as well as of the soil; but neither of these circumstances explains the disparity above noticed, as the plants were all of one season, and growing in the same soil.

The time I choose for beginning my operations, is just before the plants are about to flower, and when they are three feet high; but as their size must depend upon the weather, &c., I am not at all guided by the latter circumstance. At this period, the plants are much branched, and it is now that they are most prolific of milky juice: if permitted to stand longer, the stems and branches acquire a woody texture; and then, resisting the knife, the operation of cutting is rendered difficult; and, be-

sides this, they soon become fistulose, when much of the juice would be lost in their cavities.

Having found the flower-buds to be the most productive parts of the plant; and, as these are terminal, I am very sparing in this stage of the process; beginning, and proceeding, with very thin transverse slices, just sufficient to open a passage for the juice, nor is it necessary at any stage to cut off more: and two important advantages are gained by preserving as much as possible of the height of the plants,—first, it is quite manifest, that the operation being thus extended, the harvest is made more productive to the proprietor; and, secondly, it contributes much to the facility and comfort of the operator, by obviating a great deal of unnecessary stooping.

The incisions are best effected by grasping the plant in the left hand, so as to bring the extremities of the branches and stem together; while, with a broad-bladed knife held in the right hand, a thin slice is taken off them all at one cut, taking care to leave the surface as level as possible.

When about a hundred plants have been exposed in this way, they are wiped with a piece of thin calico, about three-fourths of a yard square, which has been previously dipped into water and wrung out. In this condition it absords the milky juice very completely, and with great dispatch, the operator turning it occasionally as he passes along the rows of plants: when he has finished wiping,

the cloth is thrown into a vessel of water, wherein it is worked about with the hand by another person, stationed there for the purpose, and wrung, to be in readiness for the operator on his return for it, after having cut a fresh hundred; and so on through the day. The person, whose duty it is to prepare the cloths, may be kept well employed by about a dozen collectors.

As often as the water becomes well impregnated with the juice, which may be known by its thickened and dark brown appearance, it is poured into a number of shallow vessels, and placed in a situation open to a free circulation of air, but defended from rain and dust; and, in this way, the water is allowed to evaporate, until the lactucarium be of a proper consistence.

After two or three days, the cloths require to be changed for fresh ones, being now choked up with caoutchouc, or a substance analogous to it, which abounds in the milky juice: thus a considerable proportion of this impurity, by the above process, is got rid of, and almost the whole of it might be avoided, simply by now and then pouring off the fluid contents of the vessels in which the slow evaporation is going on; the caoutchouc being precipitated of a light colour, and exhibiting a totally different appearance from that of the rich black liquid above it.

As often as I have been engaged in the preparation of lactucarium, I have employed boys, not

merely because of the lower wages at which they are to be hired, but because, with good looking after, they are better adapted to the work than either men or women: the latter indeed, are quite inadmissible; as their dress but ill qualifies them to pass between closely planted rows of lettuces streaming with the milky juice, without both injury to the plants, and a great loss of that fluid.

I have uniformly found that the average produce of lactucarium, according to this method, is two ounces a day from each boy, so long as the plants continue healthy, a state depending much on the mercy of the operator, for they will not endure to be wounded, without evincing manifest signs of debility from its too frequent repetition.

It is not an object of this paper to consider the properties and application of the medicine, for the production of which I have now endeavoured to explain my process; and a specimen of which so obtained, I submit to the inspection of the Society: but I may be allowed to advert to its importance upon two high authorities,—that of Dr Duncan *sen.*, whose opinion of its merits appears more than once in the Memoirs of the Society, and that of Dr Scudamore, who, in his celebrated Treatise on Gout (4th Ed. page 249.) thus speaks of it. "The soporific medicine, prepared from the inspissated white juice of the lactuca sativa, introduced to our notice by Dr Duncan *sen.*, is well entitled to good report; and, I am happy in this opportunity of

bearing testimony to its virtues. From my experience of it effects, upon a very extensive scale, in miscellaneous cases, I can much recommend it as a mild sedative, calculated to tranquillize without stimulating; to allay cough, and to promote sleep; but as an anodyne medicine, to relieve pain, I find that I cannot place reliance upon it." Besides these distinguished modern sources, we have the tradition of remote ages attesting the strong soporific properties of the lettuce. In ordinary life, it is by no means uncommon to find persons complaining of unusual drowsiness after having eaten heartily of this vegetable. A striking illustration of this effect occurred a few years ago at the market-town of Mold in Flintshire; and, as it is interesting and well authenticated, having come under the eye of a medical friend, then of that place, and now a student in the University of Edinburgh, I beg leave to state the case.

"A youth about sixteen years of age, was discovered by his bedfellow, a brother, between six and seven o'clock in the morning, their usual hour of rising, to be in such a profound sleep that he resisted all the ordinary means to awake him: in this state he was left till nine o'clock, when these exertions were renewed, but ineffectually, for his slumbers continued unbroken. Between ten and eleven o'clock, his family becoming somewhat alarmed, more powerful agents were had recourse to; mustard was now applied to his mouth; and snuff, spirit of hartshorn, and other

stimulants were unsparingly presented to the nostrils. My friend arrived in the midst of these experiments, which, together with hard pinching, and violent shaking, after considerable difficulty, now succeeded in rousing the young man from his lethargy. For some hours afterwards he continued sleepy, and complained of slight giddiness. The only cause he or his friends could assign for this extraordinary affection, was, that he had the preceding night eaten largely of lettuce at supper."

If lactucarium have been found inert in the hands of some practitioners, I have ample reason for thinking that, in such instances, the medicine was not genuine; having ascertained that the extractum lactucæ (the inspissated *expressed* juice) is frequently sold and compounded for the more powerful preparation, and this, I believe, more from mistake than with any intention of fraud. Pure lactucarium is, however, a substance so truly *sui generis*, that I know no article in the long catalogue of our Materia Medica, which bears any analogy to it, when made after the manner detailed in the foregoing pages; and it would not be easy for any person, who has once well examined it, to be deceived by any imitation.

It is by no means a conclusive argument against its usefulness, that this medicine has not ere this been more generally adopted in practice: Every day's experience demonstrates the difficulty there is, in establishing any new or revived remedy with

the profession; and the caution with which it regards every novelty, is not, perhaps, the least title it has to the confidence of the public. But a formidable barrier to the universal employment of lactucarium, is its hitherto high price, for though it is brought into the market at a price little exceeding that of opium, still, its comparative mildness rendering it necessary to give a dose at least five times greater than of the latter, it is much too costly for unlimited use. From an experiment, however, which I undertook during last summer, at the liberal suggestion of Dr Duncan *sen.*, in his garden near St. Leonard's Hill, the results of which I am about to state, I have reason to hope that at no distant period the opium from lettuce will be within the reach of the public at large.

The object of the experiment was to learn how much of the inspissated milky juice is obtainable from a given number of plants, and the time required for its collection. The number of plants was one hundred; and in this instance I operated upon them six times a day for twenty days, but not in succession, having frequently allowed a day to intervene, and sometimes two or three days. I was an hour going over them six times,—so that, reckoning a day's labour at ten hours, I was two whole days employed; and the amount of product was three ounces and a half; which is nearly double what I ever got before from the same number of plants, merely because I dwelt longer over them.

Mr Young, as far as I know, has not stated the amount of dried juice obtained by his method.

Mr Henderson of Brechin, in his paper, published in the Memoirs of the Society (Vol. I. page 259.) states, That, by a process there described, he obtained only, with great exertion in twelve hours, one ounce of lactucarium from 300 plants. And he proceeds with a calculation, " that, accordingly, an acre of land will yield but twelve pounds of that substance, allowing to the acre 60,000 plants. Supposing this estimate to be correct, and my process were followed, the weight of opium, from an acre of lettuce, should be upwards of 130 pounds avoirdupois. But as, on a very large scale, the process must be in the hands of a great many individuals; and, as great waste under such circumstances is inevitable, it would be too sanguine to look for such a harvest. If, however, an acre of ground will produce so many as 60,000 plants, I have no hesitation in saying, *cæteris paribus*, that 100 pounds weight may be obtained from it, but at what expence I am not prepared to say.

If it be designed to have the lactucarium perfectly free from caoutchouc, the process recommended by Dr Duncan *sen.* may be successfully employed. It consists in digesting the lettuce-opium in a mixture of equal parts of alkohol and water, which will take up the active principle; and, when it has stood long enough, in evaporating the liquid: the spirit used in this refining process may be reco-

vered by distillation in glass-vessels, over a sand-bath, and without injury to the medicine, provided it be not exposed to a temperature exceeding 170° of Fahr. which is sufficient to drive over the alkohol; most of the water remaining in the retort, which is afterwards to be subjected to evaporation.

I have had no opportunity of ascertaining how far my mode of collecting lactucarium may be applicable to opium from the Papaver somniferum; *a priori*, it seems as well adapted to this as to the former, in our own country more especially, where the great objection to the cultivation of poppies for opium, is the variableness of climate; for the juice in the manner I have attempted to describe, might be secured as soon as the incision has been made into the capsule, and thus prevent any loss from a shower of rain; which would be of great magnitude, under such an occurrence, were the Turkey mode of gathering the opium the one under operation.

Oct. 23. 1823. F. G. PROBART.

XXIX.

Observations on the preparation and use of Lactucarium, or Lettuce-Opium, an article of the Materia Medica, lately introduced into the Edinburgh Pharmacopœia, and recommended as a powerful sedative medicine.

By Andrew Duncan *sen.*, M. D. & P.

(Read 4th December 1823.*)*

From the earliest periods of Medicine, it seems to have been a well known fact, that the common Garden-Lettuce, the Lactuca sativa of Linnæus, possessed considerable soporific powers. Dr J. A. Murray of Gœttingen, one of the most learned writers on the Materia Medica, has collected many undeniable proofs of its employment for the purposes of medicine, as well as of diet, by the most eminent physicians both of ancient Greece and Rome. Among other particulars, he observes, "*Galenus, sibi ipse senex, Lactuca comesa, somnum conciliavit.*" Galen, in the observations which he has made on Lettuce, when treating *De Alimentorum facultatibus*, has said, *Itaque Lac-*

tuca vespere comesa, unicum mihi insomniæ erat alexipharmacum.

Not ignorant of what Professor Murray had published respecting the soporific power of Lettuce, I was many years ago struck with the remarkable resemblance which the inspissated juice of the Lettuce in my garden, the Opium Lactucæ as it may be called, bore to the Opium Papaveris. For every juice spontaneously exuding from a wounded plant, and spontaneously inspissated, may, from the strict etymology of the Greek word οπος *juice*, be termed the Opium of that plant.

It is well known, that both the Papaver and Lactuca, when wounded at certain periods of their growth, yield a large quantity of a thick milky fluid. This white fluid, when the watery parts are evaporated, assumes from both plants a black colour. But besides resemblance in colour, these two opiums have also a very great similarity both in smell and taste. It was therefore no unnatural conclusion, that their medical properties might also be somewhat similar. This circumstance, led me, more than thirty years ago, when I was engaged in giving lectures on the Materia Medica, to mention the common garden-lettuce, as a plant which I thought might furnish a valuable addition to the substances usually employed, with a view to the removal or alleviation of disease.

I did not indeed expect to find the Opium Lactucæ, by any means an article of equal medical

powers with the Opium Papaveris. For, with regard to that article, I have long been convinced of the truth of an observation made by the sagacious Sydenham, who has emphatically said, "*Ita necessarium est Opium in hominis periti manu, ut sine ea manca sit ac claudicet medicina.*"

But although the Opium Papaveris be justly entitled to this high encomium, yet there is perhaps no medical practitioner in Britain, who has not frequently prescribed it to patients, with whom, from peculiarity of constitution, it almost never fails to produce highly distressing consequences. With many individuals, it particularly induces severe sickness and vomiting after its soporific effects are terminated. Hence, there are some, who, from what they have formerly suffered, in no situation or circumstances, even the most urgent, will venture to employ it.

But besides this well known fact, of the Opium Papaveris disagreeing very much with certain constitutions, it is equally well known that there are different conditions in diseases, where it may be very desirable to obtain sedative effects; that is, to induce sleep, to allay pain, or to restrain inordinate action, although there may be circumstances, by which the use of that most powerful of all sedatives, the Opium Papaveris, is at the same time strongly contra-indicated. It is not surprising, therefore, that it should long have been a desideratum in the healing art, to discover some other

powerful quieting medicine, as the best succedaneum for Opium.

These circumstances led me to turn my thoughts on some method of collecting and preparing the Opium Lactucæ, that I might give a fair trial to its effects in actual practice. I dedicated to this experiment, in my garden near St Leonard's Hill, in the neighbourhood of Edinburgh, a small bed of that variety of Lettuce, which is commonly known among our market gardeners at Edinburgh, by the name of Ice or Coss Lettuce. I allowed the plants to shoot up, till the stem was about a foot above the surface of the ground. I then cut off about an inch from the top of each plant. The milky juice immediately began to rise above the wounded surface. Though at the time of exudation, it appeared in the form of a viscid white coloured liquid; yet next day, in consequence of exposure to air, and the spontaneous evaporation of the mere watery part, I found that a firm encrustation of a dark or even a black colour, and much resembling the Opium Papaveris, was formed over the surface where the stem was cut off.

I could not, however, separate this encrustation from the plant by scraping, in the manner followed for collecting the milky juice exuding from the head of the Poppy, when it has assumed the form of the Opium Papaveris. I therefore cut off from my Lettuce with a sharp knife, a thin slice of the stem, to which the dark coloured opium-like mat-

ter adhered. This slice, with the adhering Opium Lactucæ, as it might be called, was thrown into a wide mouthed phial, about half filled with weak spirit of wine, the *alcohol dilutum* of the Edinburgh Pharmacopœia, which is formed of equal parts of rectified spirit and water. By this menstruum, I found that next day almost the whole of the black incrustation on the thin slice of the stalk, the *Opium Lactucæ*, which adhered to the herbaceous part when thrown in, was dissolved by the spirit. I had thus, then, obtained a spirituous solution of the Lettuce-Opium, which possessed the taste of the black encrustation, and had also acquired from it a dark colour. The herbaceous part of the slice, I need hardly observe, remained undissolved, and probably had yielded nothing but its Opium to the spirit, which might now be considered as a Tincture of Lettuce-Opium.

Next day, each of my plants, in consequence of the fresh wound inflicted by the removal of the thin slice the preceding day, afforded a fresh incrustation, and in this manner for some length of time, I obtained every day from each of them a fresh portion of Lettuce-Opium. By throwing these into the spirit formerly impregnated, I soon obtained what I concluded to be a saturated solution of that exudation which is yielded by wounded Lettuce plants. To this saturated solution, which had nearly both the appearance and taste of the liquid laudanum of the shops, I gave the name of *Solutio saturata succi spissati Lactucæ.*

This solution I tried both on myself and others, with the view of determinating its effects on the living human body, when taken into the stomach. From the result of these trials, no doubt remained that this saturated solution of Lettuce-Opium possessed many of the sedative qualities of liquid laudanum, or tincture of Opium, and particularly, that it operated as a powerful soporific.

It was however evident, that the quantity of the Lettuce-Opium contained in the supposed saturated solution, might, from different causes, admit of considerable variety. To obtain a form, therefore, in which it might be exhibited with greater certainty as to the doze, I evaporated the spirit from the saturated solution, till, by the removal of the spirit, I brought the Lettuce-Opium to a solid state. In this process, I followed the same plan as was directed by the College of Physicians of London, in the edition of their Pharmacopœia published in 1745, for preparing the *Opium colatum*, or *Extractum thebaicum*, as it was then denominated. By this process I obtained Lettuce Opium, which had very much the same appearance with the Opium which is imported into Britain from Bengal, and which is in general a much softer substance than the Turkey Opium. To the substance thus obtained, I gave the name of Lactucarium, that it might have a very different appellation from the inspissated juice of the Papaver, to which I considered the title of Opium as already appropriated by universal usage.

It is perhaps hardly necessary to observe, that in this method of preparing the Lactucarium or Lettuce-Opium, I followed nearly the plan which is adopted by the College of Physicians of Dublin, for preparing what they have denominated *Opium purificatum.* The purification of this article is often not unnecessary. For it is a well known fact, that opium, as imported into Britain, is often mixed with a considerable proportion of foreign matters, by which it is much adulterated. It is however now ascertained, by undeniable experience, that this mode of purifying opium is liable to strong objections. It is found to be both injurious to the opium and uneconomical. Hence, though once sanctioned by the London College, they have now discarded the Opium purificatum from the last edition of their Pharmacopœia.

That opium undergoes very considerable changes by the action of the fire in evaporation, cannot be doubted. Accordingly, in place of this means of purifying opium, the London College now merely recommend, that the opium as imported, should be diligently separated from all obvious adhering impurities. As a proof of the superiority of well selected opium over the Opium purificatum, prepared by the action of fire, it is sufficient to remark, that, on keeping, the Opium purificatum soon becomes mouldy, which is never the case with well selected opium.

There is, I think, every reason to believe, that

Lactucarium as well as opium may be materially affected by the action of that heat which is necessary for the evaporation of the spirituous menstruum. But besides this objection, an additional one also occurs to this mode of preparing Lactucarium, from the expence; for, if thus prepared with due care, it could not be sold by the druggist but at a very high price.

I had however no doubt, that if an economical mode of preparing the Lactucarium could be invented, such were its effects as a sedative, and particularly as a soporific sedative, that the preparation of it for supplying druggists might become a lucrative branch of trade to industrious and intelligent market-gardeners. From these considerations, on my suggestion, the Caledonian Horticultural Society offered a premium for the best method of preparing Lactucarium. The subject was thus recommended to the attention of ingenious men, and that prize-medal, as will be seen from the Memoirs of the Society, was awarded to an ingenious medical practitioner, Mr John Young, surgeon in Edinburgh, who had not long before obtained a prize-medal from the Society of Arts in London, for his mode of preparing Opium in Britain from the Papaver somniferum.

Mr Young adopted the same plan in preparing both Opium and Lactucarium. Of that plan, it is here unnecessary perhaps to say any thing. I shall only observe, that a full account of his method of

preparing Lactucarium, is published in the 2d volume of the Memoirs of the Caledonian Horticultural Society. It may be sufficient to say, that, by his method, the milky juice exuding from the plant when it is wounded, in place of being allowed to harden by spontaneous evaporation, as is done with the Opium in Bengal and other countries, from which it is imported into Europe, is immediately collected into small tin pots, in its most liquid state.

It is removed from the wounded part of the plant either by means of a bit of cotton cloth, a small painter's brush, or by the point of the finger of the boy employed to collect it, and transferred to a small tin pot, appended to a button of his coat. In this manner a large quantity of the viscid white fluid may be obtained in a short time. From afterwards inspissating this fluid by a very moderate heat, communicated either from a water or vapour bath, Lactucarium, having the consistence as well as colour, smell, taste, and other sensible qualities of soft opium from the poppy, may easily be collected at a very inconsiderable expence. The opium and Lactucarium thus prepared by Mr Young, have, in all their sensible qualities, a very near resemblance, and may be obtained from the Papaver and Lactuca in Britain with great ease, at a moderate expence, and to a very considerable extent, from even a small spot of ground.

During the summer 1820, Mr Young was able, from a small plantation of Lettuce, to sell upwards of fifty pounds weight of Lactucarium, prepared according to his method, to Messrs Cheynes, of Apothecaries' Hall, Edinburgh, and from them many Apothecaries have been supplied with this article in what may be considered a genuine state. I am, however, sorry to say, that even in Edinburgh, notwithstanding this supply, articles have been sold under the name of Lactucarium, which were shameful adulterations.

There can be no doubt that Mr Young's plan is both a very easy and very economical mode of collecting Lactucarium. But the substance thus obtained, though it possesses the general appearance, and a good deal of the soporific power of opium, differs from it in one essential particular. It is a substance much less soluble in any menstruum, particularly in the diluted alcohol, the menstruum commonly employed in forming tincture of opium, and indeed tinctures in general formed from substances, where some parts can be extracted by a watery, and others by a spirituous, menstruum only.

In consequence of this circumstance, its difficult solubility, Mr Young's Lactucarium differs very materially from that which is obtained by my method of evaporation from the saturated solution, which, as may naturally be supposed, is again after evaporation entirely soluble in diluted alcohol. From this it may reasonably be presumed, that

they will also differ in their effects on the human system.

But, besides my method, and Mr Young's, a third way of preparing Lactucarium has been recommended by Dr Paris of London, in his late valuable publication, entitled Pharmacologia. In that work, under the general title of Extracta, he has, among other articles, introduced the Lactucarium of the Edinburgh Pharmacopœia. He has denominated it Succus spissatus Lactucæ Sativæ, and has given the following method of preparing it, communicated to him by Mr Probart of Great Portland Street, an eminent London chemist. In Dr Paris's Pharmacologia, Mr Probart's method of preparing Lactucarium is related in the following words, by Mr Probart himself.

" I have the Cos Lettuce, (says Mr Probart), planted about eight inches asunder, in rows, between which there is sufficient space to enable persons to pass up and down, without injuring the plants. I commence my operation just before the plant is about to flower, by cutting off an inch of the stem. The milky juice immediately exudes, and is collected on pieces of wove cotton-cloth, about half a yard square. As soon as this cotton cloth becomes charged, it is thrown from time to time into a vessel containing a small quantity of water, which, when sufficiently impregnated, is evaporated at the common temperature of the atmosphere in a number of small dishes. The Lac-

tucarium, in a few hours, is found adhering to the vesesls in the form of an extract, but differing from every other in all its sensible properties. This method enables me to collect Lactucarium with great facility and dispatch. But it is still attended with considerable expence. The proportion of the milky produce is necessarily very small, and the price of the medicine consequently high, and therefore not within the reach of general practice.

" This consideration led me to make farther experiments, for the purpose of ascertaining, whether an extract might not be obtained from the plant, possessing all the properties of Lactucarium, when administered in large doses, which could be introduced at a comparatively trifling cost. In prosecuting this inquiry, I found, that the plants contain most of the milky juice when they have flowered, and the leaves are beginning to assume a yellow hue. And I observed, that, when cut down, the milky juice assumes, for the most part, a concrete form, having subsided in the bark of the stalk, and in the old leaves; a circumstance which accounts for the extreme bitterness of those parts. I was naturally led, from these circumstances, to chuse the above period for my operations, and to select those parts only of the plant for my extract, rejecting the substance of the stalk and the young sprouts. My method of procuring the extract is as follows: I first macerate the parts in water for twenty four hours, and then boil them for two, af-

ter which I allow the clear decoction to drain through a sieve without any pressure. This is evaporated, as far as can be done with safety, and the process is finished in shallow dishes, in the manner above described, for obtaining the Lactucarium. This extract, which I have called the *Extractum Lactucæ concentratum*, is of course less powerful than Lactucarium. But it possesses the properties in larger doses, and it has been found equally useful in a number and variety of cases, and is not more than a sixth-part of the price.

" The *Succus spissatus Lactucæ sativæ* of the shops, must of necessity be almost inert, since it is commonly prepared, at that period, when the plant contains none, or very little of the milky juice; and even if the Lettuce can be employed at a more mature season, it must still fail to afford an extract of any strength, as it is merely the expressed juice, and that too of the whole plant indiscriminately, and will be found to contain a very minute portion of the Lactucarium, the great bulk being nothing more than the inspissated green juice."

For these very ingenious and judicious observations on the preparation of useful sedative medicines, from common Garden-Lettuce, the medical world is, I think, much indebted to Mr Probart; and it is, in my opinion, much to his honour that he has freely permitted Dr Paris to communicate to the public the processes by which he prepares, both the *Lactucarium* and the *Extractum Lactucæ*

concentratum. For, these processes, if they had been kept secret, in the hands of an empiric, might have been highly lucrative.

Of the articles thus prepared by Mr Probart, I can yet say nothing from my own experience. But I confidently hope, that Mr Probart's observations will lead other chemists to prepare this medicine with the same attention and fidelity. For I have good reason for believing, that in the stores of some Apothecaries, even in Edinburgh, articles shamefully adulterated have been sold for Lactucarium. I shall now conclude these observations on the preparation of Lactucarium, by mentioning a method, from following which, every country apothecary may, I am persuaded, furnish his own shop with this useful soporific, in a perfectly genuine state, at a very trifling expence, and with very little trouble.

The preparation of Lactucarium, which I have of late principally used in practice, is what I have described in a former part of this paper under the name of the *Solutio saturata succi spissati Lactucæ.*

It is, as I have before observed, a simple solution of the opium-like incrustation which is formed on the wounded stalk of the Lettuce, in the *Alcohol dilutum* of the Edinburgh Pharmacopœia.

This saturated solution I have for more than a year past prescribed under the appellation of the Tinctura saturata Lactucarii. And under that appellation, it is kept in the shop of the Royal Pub-

lic Dispensary of Edinburgh, to answer the prescriptions of any of the medical practitioners attached to that institution, which it is well known annually affords relief to thousands of the indigent sick in the City and environs of Edinburgh.

This saturated Tincture is, in my opinion, the cheapest and best formula yet proposed for obtaining a most useful sedative medicine from common garden Lettuce; and every apothecary, who can appropriate a small plot in a garden to the purpose of preparing this article, may, with very little trouble supply his own patients with this powerful medicine in a state perfectly genuine.

Of the medical properties of Lactucarium I shall at present say very little, in addition to what I have already published. In the year 1810, with the hope of inducing intelligent market-gardeners to prepare from Lettuce a useful medicine, which they might sell with profit, I read some observations respecting Lactucarium to the Caledonian Horticultural Society. These observations were afterwards published in the Memoirs of that Society. I there represented the Lactucarium as an article from which I had seen manifest good effects, both as inducing sleep, as allaying inordinate muscular action, and as alleviating pain. Not long after that paper appeared in the Memoirs of the Horticultural Society, in the year 1816, I annexed to the second edition of my "Observations on the distinguishing Symptoms of three different Species

of Pulmonary Consumption, the Catarrhal, the Apostematous, and the Tuberculous," an appendix, on the preparation and use of Lactucarium. I there mentioned, that farther extensive experience had fully confirmed my former opinion of the benefit which might be derived from Lactucarium, in the practice of medicine. And, finally, in the year 1820, to the third edition of my Observations on Pulmonary Consumption, I subjoined some farther remarks on the benefit which might be derived from Lactucarium: For, by that period I had for more than ten years found it to be a highly useful sedative medicine. I had particularly often recommended it under the form of the Trochisci Glycyrrhizæ cum Lactucario, as they are denominated in my Observations on Consumption, as a means of alleviating cough, not merely in phthisis, but from many different causes; and I have found it, in almost every instance, highly beneficial, as giving temporary alleviation of cough, without being followed by the slightest disagreeable consequences; and particularly without any of those consequences which, with some constitutions, result even from the small quantity of opium contained in the Trochisci Glycyrrhizæ cum Opio of the Edinburgh Pharmacopœia.

Under this form of Lactucarium-lozenges I have myself had recourse to it with great benefit, both during the last and several former winters, when subjected to troublesome cough from accidental

cold. I can therefore attest the efficacy of Lactucarium as a sedative, from experience in my own person. Whether it produces these effects from containing that active principle, which some late writers have termed Morphia, and on which they suppose that the soporific power of opium depends, I will not pretend to conjecture. But, that Lactucarium does possess a very considerable sedative quality, particularly in allaying the inordinate action of cough, I can attest from experience in my own person. And, with me at least, it has never been followed by any of these disagreeable effects which, in certain constitutions, I have seen result from the employment of even the smallest quantity of opium.

To the observations which I have formerly published on the benefit derived from Lactucarium, I shall now only add a short account of one case which occurred to me last summer; and in which, the benefit derived from Lactucarium was no less manifest than in the case of my own grandson, which is related in the additional observations on Lactucarium published in 1820, and annexed to the third edition of my Observations on Consumption.

A lady from England, the sister of a medical practitioner, came to Edinburgh in bad health. Among other complaints, she suffered much from want of sleep. After several very sleepless nights, I advised that she should take an opiate at bed

time. But she informed me, that Opium, although it sometimes procured sleep, never failed with her to be afterwards attended with the most distressing consequences; that, after taking it, she was during the next day affected with almost constant sickness and vomiting. She added, that her brother had given her opium in a variety of different forms, and combined with a variety of different correctors, but that her dreadful sufferings on the day succeeding its use were uniformly the same. To this lady I sent a draught, containing fifty drops of the saturated solution of Lactucarium, prepared in my own garden.

When I visited her next day, it gave me no small satisfaction to find that she had enjoyed quiet sleep after her draught, and was perfectly free from any of those uneasy consequences which had uniformly resulted from the use of Laudanum, or of any other opiate; and she pronounced the Lactucarium draught, to use her own words, "the most blessed medicine she had ever swallowed." During the time for which this lady remained in Edinburgh, she repeatedly used draughts with forty or fifty drops of the Tinctura saturata Lactucarii; and on all these occasions the same good consequences were uniformly obtained as from the first draught; and not the slightest subsequent inconvenience was ever observed.

From this and numerous other cases, the good opinion which I have long entertained of Lactu-

carium, has received additional confirmation. And I shall now conclude with observing, that, although I hold Opium to be the best sedative medicine which has yet been discovered, where a medical practitioner is desirous of alleviating pain, of allaying inordinate action, or of inducing sleep; and although I consider it as justly entitled to the encomium bestowed upon it by the illustrious Sydenham, and even to the appellation which some have given it, "*The Quacks' Sheet-Anchor*," as being the active constituent of many of their most powerful secret nostrums; yet I think, that Lactucarium, as a sedative, is justly entitled to the second place. Where there are objections to the use of opium, which, from peculiarity of constitution, is by no means uncommon, I know no article which can be compared with Lactucarium, or the Opium Lactucæ, as a substitute for the Opium Papaveris.

XXX.

Description of a Vinery with three Rows of parallel Trellises.

By the Rev. Henry Wastell, Newbrough, near Hexham.

In a Letter to the Secretary.

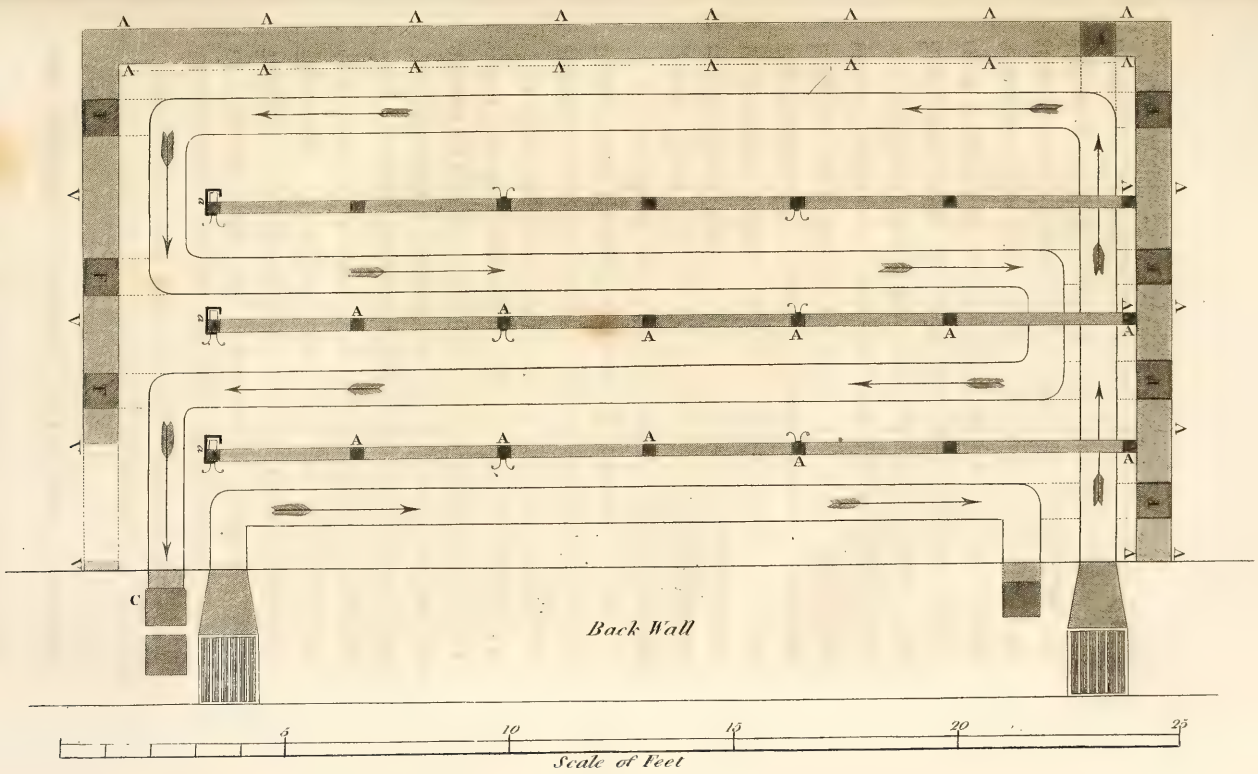
(Read 11th March 1824.)

Sir,

In compliance with your suggestion, that a detailed account of my Vinery with rows of parallel trellises, would not be unacceptable to the Caledonian Horticultural Society, I have much pleasure in sending you the following description, together with a ground plan and end view, which (if you think them worthy of further notice) I will thank you to do me the honour of laying before the Society.

When this building was first constructed, in the year 1790, it was not intended *principally* for a vinery, but for a small pine-stove, with vines trained up the rafters. In this form it continued for

about eight years, and with very good success, producing excellent fruit of both kinds, when an accident, from fire, having taken place in the succession-house, whereby the pine-plants for the two next years were totally destroyed, the pinery was given up, and the bark-pit removed. I mention this circumstance, as it accounts for the only defect I have ever observed in this vinery in its present state, namely a want of space between the trellises sufficient for admitting a step-ladder to regulate the vines on the rafters, without injuring the fruit below. This defect, however, could not have been remedied, without either reducing the number of trellises, or by taking the building entirely down, and thereby destroying the whole of the vines, then in full bearing. It was therefore determined not to alter its *external* form. The bark-pit, however, being removed, a large portion of the house was unoccupied. After some time the plan of parallel trellises was thought of and adopted. The only plausible objection then made, (and which is still made by persons unacquainted with them), was, that the lower branches, by being too much shaded, would not bring their fruit to perfection. To supply the partial exclusion of the solar rays, recourse was had to an increase of artificial heat, by making one of the flues pass between each of the trellises; and so effectual has this method proved, that I can confidently state, from upwards of twenty-five years experience, that the grapes first ripe

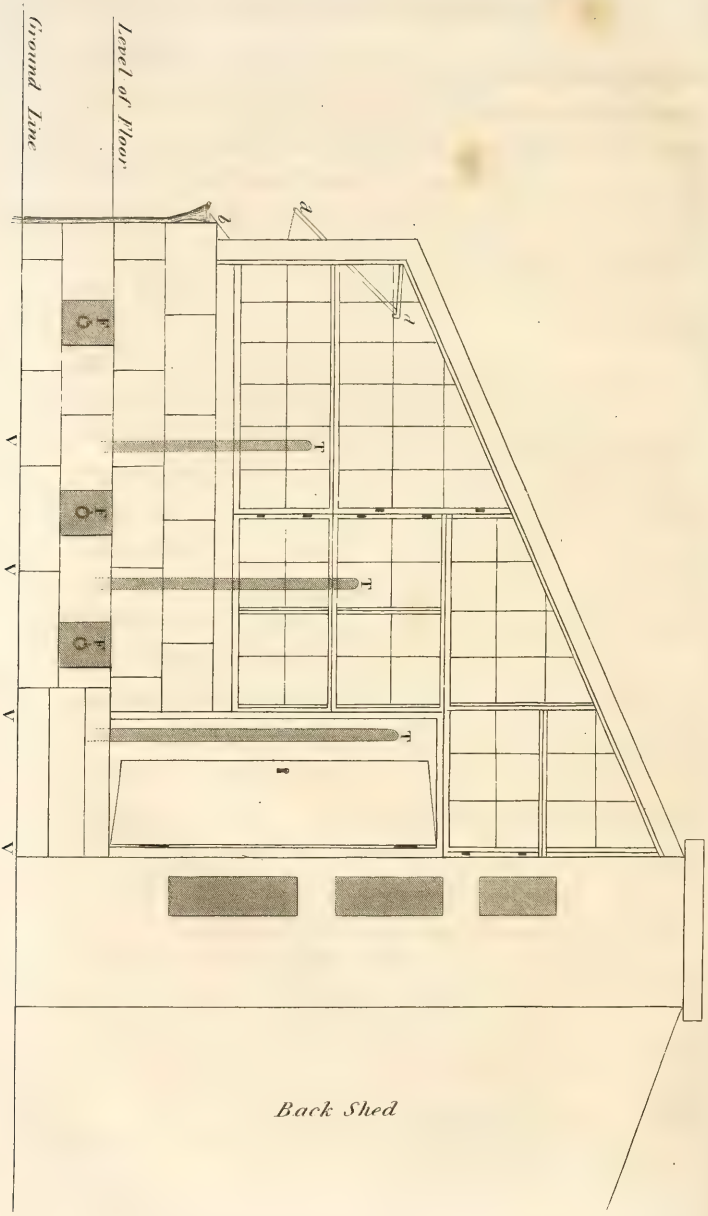
PLATE VI.

are invariably produced by the lower branches, that is, by those nearest the flues.

The house is heated by two furnaces. The flue from that nearest the door, on entering the house, takes a direction immediately behind the last row of trellises, when it re-enters the back-wall, and having made three turns, terminates in a vertical chimney. The flue from the other furnace is carried first along the end of the house opposite to the door; it then turns along the front, and afterwards takes a course between the rows of trellises, as shewn in the ground-plan, and, entering the chimney C in the back-wall, the smoke is carried off. The flues being so immediately under the flagging, afford an easy method of instantaneously filling the house with steam, by means of a watering-pot.

The trellises are made of deal; the upright supports, Plate VI. A A A, being $2\frac{1}{2}$ by 2 inches thick; their lower ends are let into the floor, and to fix them more steadily, the alternate ones are strengthened by pieces of hammered iron, 13 inches long, $1\frac{1}{2}$ inch broad, and $\frac{1}{4}$ of an inch thick, fastened by screws, each piece terminating in a claw, which is let into the floor and secured by lead. The horizontal rails of the trellises are slips of deal 1 inch broad, and are let into the uprights at about 4 inches from each other. To these the vines are *tied* as they advance in growth; no nails, except on the back-wall, being ever used. The height of the lowest trellis is 3 feet 6 inches, the second is 4 feet

6 inches, and the highest 5 feet 3 inches. The vines are all planted on the *outside* of the house, and are introduced through apertures in the wall marked V V V in the plan, Plate VI. Those on the front enter on the level of the *floor;* those at each end, on that of the ground-line. These last pass under the end-flues before they reach their respective trellises, to the ends of which they are trained with an upright stem, from which, by proper pruning, shoots are annually produced, and trained in a horizontal direction. The apertures for the vines on the front are made to correspond with the rafters; and the vines are secured from any undue degree of heat from the front flue, by a small air-flue of three inches wide, marked on the ground-plan by a dotted line. Over this, and on a level with the bottom of the front sashes, there is a fixed shelf, nine inches broad, extending the whole length of the house. This is found very useful for holding pots with exotic plants requiring a greater degree of heat than a greenhouse affords; and under this is a moveable shelf, for pots with cuttings, &c. requiring warmth and shade.

In the outer wall, which is nine inches thick, there are square stones, with strong rings of iron let into them, marked F F F in Plate VI. These take out very readily whenever it is found necessary to clean the flues, into which they open a direct communication, the spaces between each of these, and the bend of the flue being built up


Ground Line
Level of Floor
F
O
F
O
F
O
T
T
T
S
Back Shed

with bricks loosely put in and slightly plastered. At these openings a *wooden* rake, with a long handle about ten feet in length, is introduced, and the flues are cleaned without interfering in the slightest degree with the interior of the house; and if this operation be performed in a calm day, it is got over without causing any dirt on the outside.

The roof-lights are all fixed, and are never taken off until they require fresh painting, with the exception of three of the upper ones, which open about half their length, and are moved, as usual, by pulleys. Those windows in the end view, marked as with hinges, all open, as do the corresponding ones opposite. The whole of the windows are so fixed as to be easily taken out without lifting any part of the frame-work. A trellis, the bars of which are made to coincide with the frame of the window, is placed at each end, and on these the vines at each end of the house are trained, as well as on the rafters. The front lights are made to open on pivots; one is represented as open in the end view at *d d*, Plate VII. A thin board *b* is fixed along the front, outside, for the purpose of throwing off the rain, which falls from the roof, into a wooden spout; the ends of this open into two small leaden cups, to which pipes of lead are fixed, and by these the wet is carr ed off. till it meets with a gravelly subsoil.

The small parts at the end of each trellis to-

wards the door, and marked *a a a*, in the ground-plan, Plate VI., are pieces of hammered iron, three inches in height, fixed by screws to the end of each trellis, extending beyond the apertures by which the vines are introduced, and essentially useful in guarding the stems of the vines from injury from the feet of persons passing.

Having now given you such an account of my vinery, as I hope will, by a reference to the plan, be sufficiently explicit, I have only to add, that were I going to erect a new one, the only improvement of material consequence which I should adopt, would be an addition of six feet to the length, and three feet to the breadth of that I have just described. The dimensions would then be 30 feet by 15; this would be heated by the same furnaces, and would admit another row of trellises, as also two more vines on the additional rafters; making twenty in the whole, which is, I think, a greater number of vines than can, with success, be grown in any vinery of the same dimensions, unless constructed with rows of parallel trellises.

NEWBROUGH,
February 14. 1824. } H. WASTELL.

XXXI.

On the varieties of Lolium perenne; and on the modes of making permanent pasture by Gramination or transplanting of Turf.

By George Whitworth, Esq. of Acre-House, near Castor, Lincolnshire.

In a Letter to the Secretary.

(*Read* 10*th June* 1824.)

SIR,

In a conversation with you on the varieties of Lolium perenne, and the advantages accruing from the extended cultivation of the best kinds of this grass, you did me the honour to request I would take the trouble to draw up, for the Caledonian Horticultural Society, an account of the habits and properties of these varieties, from the actual observations made upon them, in my practice and experience; and with this request I now cheerfully comply.

Some years ago, from remarking the richness of the pasture-lands in my own county, in the neighbourhood of the old abbeys and religious houses, which once with us so much prevailed, I was induced to believe that something had been done, in many instances, to establish those grasses, the superiority of which is, in many of the pastures connected with them, decidedly manifest to the eye of even the most common observer. In all of them I found the superiority mainly to consist in their possessing some of the very best varieties of the perennial Ray-grass. Anxious to promote improvements, I immediately set about collecting some of the seed from the most luxuriant and finest of the varieties there so abundantly offering; but in this plan I failed; for I found several of the best of them not giving perfect seed in such a quantity as to allow of their being profitably propagated by it. I then had recourse to transplanting turfs of these and other perennial grasses, in order to make permanent pasture; and in this way I succeeded in a manner to meet my fullest wishes. I recommended this mode of propagating these grasses under the name of *Gramination*. It has been adopted in various parts of South Britain with great advantage, and particularly by that great patron of agriculture, Mr Coke of Norfolk. At Holkham, this mode obtained the name of *Inoculation*. I may here notice, that one person who had been taught by me, having allowed himself to

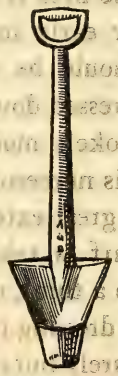
be considered as the first suggester of the plan, a Committee was appointed at the Holkham sheep-shearing in 1821 to investigate my claim to priority, and settled the claim in my favour,—whose certificate I have in my possession.

As has been before observed, several varieties of the Lolium admit only of profitable propagation by planting. Most, or all, of these are very abiding. When once established, so long as the land is depastured by sheep and cattle, there is no danger of losing them; but, on the contrary, they continue to increase and improve. If, however, the scythe be resorted to, and frequent mowing practised, they become much weakened, and will give place to coarser and less valuable grasses. The Dactylis glomerata, and the Avena elatior, will then take the lead. At least this has been the case, so far as I have had experience.

Here it may not be improper to state, that the impression on my mind is, that, in any situation, where the ground is properly drained and fairly prepared for the reception of the best and hardiest varieties of the ray-grass, good and fine pasture may be made in two or at most in three years, according to the quality of the soil; insomuch that the best judge in these matters would not hazard an opinion as to the time at which it was last ploughed. In some light lands in the county of Norfolk, where it is admitted pasture cannot be made by any other mode to be at all valuable, pas-

tures have by my mode been produced in the short period above spoken of, which have all the appearance, and at the same time possess all the value, of ancient meadow in their vicinity.

The advantages of planting are not confined to the making of new pasture or meadow, but may be extended to the improving of old sward or land already in grass. Even the most barren that can be found, when there is fair depth of soil, will admit of being very profitably planted. Where the plough cannot be used, an implement I have contrived, (a sort of hollowed cylinder or punch attached to a shouldered spade-like upper part, for receiving the pressure of the foot,) may advantageously be employed. This punch is three inches in diameter at the bottom. In depth it is between four or five inches. When it is used, one turf or sod drives out another, and the turf is brought up exactly as the depth to which the principal rooting extends, usually from two to three and four inches. Any smith who is a tolerable good tool-maker could make it. The shaft requires to be the length of that of the common spade, and the hilt or handle is better attached crossways to the tool, as, by this mode of fixing it, the turning it so as to bring out the sod or tuf is rendered easier to the hand.



The cost of graminating per acre, where every thing is as conveniently situated as possible, is from

20s. to 25s. The more abundant the planting, of course the sooner and the more effectually the object is secured; about twelve plants in a square yard, and a sowing of some of the best cultivated ray-grass that can be obtained, with some portion of white clover-seed, is a fit mode of doing it. In an old meadow where good grasses chiefly prevail, as in the lands before spoken of, the plough may be used, with a cutting point attached to the share, so as to bring out a square furrow. The turf may be carted to the place to be planted, and chopped into squares by sharp spades, and spread on, after the field is sown with beans, or other spring corn, or early in the winter after wheat. The turf should be placed by women and children, and pressed down by a very heavy roller. This is Mr Coke's mode, and the opinion both of him and his numerous tenantry, who have practised this to a great extent, is, that the land from which the turf is taken, though the carrying away amount to a third, or a half, is never injured by it; but if a dressing of compost be furnished, which it is surely but reasonable to give, it will even be found much benefited by the breaking of the too thickly matted turf. Some ray-grass seed ought to be sown when the compost is laid on.

Though it may be deemed in a degree foreign to the subject, I would recommend a breaking up of a very large portion of our present grass-land, where the plants it produces are not so good as we

could wish; and this, it is to be observed, is the case with a very large portion of that which, at the present time, is accounted very valuable to our farmers, both in South and North Britain, and which is never allowed to be ploughed. If we do not plant grasses to any extent upon them, they may be sown to advantage with the seeds of some of the grasses which are used in the convertible husbandry. The Achillea millefolium, or yarrow, may be introduced, as well as some other plants, very profitably. Sheep are very fond of yarrow, and eat it so close, that where they are pastured it is rarely allowed to flower. It conduces much to their health, is very productive, and will keep its verdure in the highest, the dryest, and on very rocky and barren situations.

By thus planting in all cases where practicable, or by merely breaking the ground and sowing seeds, the benefit derived is almost incalculable. Some of our unprofitable wastes, moors, and sheep-walks, might, at a very moderate expence, and in three or four years, be advanced in real value, from twenty-five to fifty per cent., and indeed, in some instances, to a much higher ratio, on their present actual worth.

In their native state, good grasses will grow at a very considerable elevation; they are found on the highest hills in Derbyshire; and on Arthur's Seat pastures, near Edinburgh, though nothing has been done in the way of improvement, some pretty good

varieties of Lolium perenne are found. As to the higher hills, it would be better perhaps to shelter them with wood, as far as possible; and were they, so far as they are capable of being stored, covered with the best and hardiest varieties of ray-grass, they might keep, and even give flesh to, if not fatten, some of the sheep best adapted to the mountain districts. Unless this grass exist in a fair quantity indigenously, we cannot insure it except by planting; but by sowing some of the earlier and most esteemed of the cultivated varieties, it is possible to improve or change the native kinds; and also, by an occasional breaking of the ground, by the spade, the hoe, the mattock, or other implement, seeds partaking of the nature of both varieties may be produced that will give grass which may be tolerably abiding in its duration, and very productive *.

* Since communicating these remarks, I had the honour to visit Sir Walter Scott, who is anxious to promote every thing that may be for the happiness of man; and in an interesting ride upon his grey nag, over the hills in the neighbourhood of Abbotsford, I did not observe a plant of Lolium of any description growing above a certain height of elevation. My friend Mr Laidlaw, who is a very intelligent gramineous botanist, had also noticed the absence of this plant on the higher hills; and in a conversation before our setting out, he told me I should not find it, and I certainly did not, though I looked for it with great anxiety. There may be several reasons why this grass is not seen on these hills. They are now covered with festuca, heath, and unprofitable plants, which have taken full possession, and there has been no system ever attended to in their

Our most eminent botanists, who have gone into the fullest description of this valuable grass, have given us descriptions of but very few *varieties* of it. Impressed with the belief that it would be presumption in me to venture an opinion where authority seemed to be against me, and where there appeared so little chance to make any impression, I long forbore offering my experience as to some excellent but unnoticed varieties. It was not indeed until encouraged by Mr Sinclair of Woburn, whose labours as a gramineous botanist, I believe, are unrivalled, and who has conferred, and is about to confer, on this country, by a new edition of the Hortus Gramineus Woburnensis, the greatest benefit, that I was induced to come forward. He did me the honour to come from a great distance to see my selected varieties of this plant, and he was pleased to express himself much gratified. He has since, by many encouraging letters, kindly noticed my labours, and given me so much countenance in my pursuit, that I am led on in the hope that I may be considered as having some pretensions to fair credit. At home I have, I believe, nearly sixty varieties of Lolium perenne, from the nar-

feeding. A portion I believe will here be pared by the breast plough; and I will take care that some of the best kinds of grasses are furnished, and if they do not sustain themselves, and shew a verdant spot for ever, with a fair dressing of compost, it will much surprise me, and, indeed, it will be at variance with every thing of the kind I have noted.

rowest leafing, and most insignificant, to the fullest growing, and most gigantic of the species. I have watched them all carefully, and may be said to have lived much among them. The most trivial circumstance connected with them has been noted, and attended to. The result has been a conviction in my mind, that there are numerous and well marked varieties which may be introduced advantageously into cultivation, some of them profitable for one course of husbandry, and some for another. One of the varieties which I have at present preferred to all the others, is highly esteemed in Lincolnshire, and has been selected by Mr Coke, on the trials made at Holkham, with the view of determining which were superior, as the best of all the numerous sorts cultivated there. Its characters are, early growth in the spring, and considerable store of foliage, compared with the quantity of culm. It makes a fine sward, and is productive in its after-grass, or latter-math. It grows throughout the winter months, when the weather is moderately fine. It is very abiding, affording good feed in any situation, and for several years; and it is profitable for annual mowing. In some soils, with a planting of the native varieties, and the sowing of the seed of this variety, good pasture-land may be made at once, with clover, as before recommended. To this variety Mr Sinclair informs me, he pays me the compliment of giving the name *Lolium perenne Whitworthiense.*

I feel pleasure in adding, that others have laboured profitably in the same line, and particularly my friend Mr William Stickney of Ridgmount, in Yorkshire. The variety recommended by him is paler in its colour than mine, later by about a fortnight in its seeding, is productive in foliage, and in bulk seems to about equal it: it is also very abiding, but, like the one called by my name, does not give much seed, rarely exceeding twenty of our bushels (Winchester) per acre. The comparative value of these two varieties has, I believe, never been tried fairly; but I should think, from what I have observed of them, that they are the two leading cultivated grasses of the day. Mr Jobson of Chillingham New-Town, in Northumberland, has also made several trials on various kinds. He has three varieties now in cultivation, one of them Mr Stickney's, and another of them Mr Bates's), all very good, and quite distinct in their characters. Mr Nicholson of Lone End, near Berwick, has a very fine variety, which he has cultivated for a great many years. A variety selected by Mr Pacey of Gloucestershire was in repute many years ago. His Grace the Duke of Bedford pointed out one to Mr Holditch, late of Thorney, which has obtained the name of *Lolium perenne Russellianum.* All these I believe are very distinct and steady in their respective characters. There is one kind which clusters in the spike, and forms a sort of double head of flowers. Some of them pretty generally branch, so as

to become panicled. There is one variety that, instead of giving seed, almost invariably furnishes new plants in the various spikelets. This is named the *viviparous*.

A variety is often cultivated which may be fairly named the *biennial* ray-grass: it merely endures toperfect its seed, of which it affords an abundant crop, from 30 to 40 Winchester bushels per acre. It then almost invariably dies. The apparent bulk is great, the culm being not unfrequently three feet high. It is, however, usually very coarse, and not nutritious. When this plant is allowed to perfect its seed, the hay is, perhaps, not of more value than the straw of barley or oats.

The late Mr Holditch exhibited three or four very tall varieties at Holkham a few years ago. They were full five feet in height, and had been grown in the neighbourhood of London. Excepting these I never found the plant I think rise to more than four feet; but of this height I have seen specimens repeatedly.

Among the numerous varieties now growing in my garden, there are at least twenty that do not give perfect seed, though they all of them furnish culm and spike. From those which give perfect seed, the same variety is thereby produced, provided the plants are selected and separated from other kinds. If they be allowed to stand close by others in the time of flowering, new hybrid varieties will result. By crossing the breeds in the

plants cultivated in the garden, there must be great opportunities for skill, in producing still more improved varieties. If this plan of crossing were conducted with care, it is possible that all our present established varieties might be much excelled, and some varieties found, better both for the convertible husbandry, and for sowing for permanent pasture. After having shewn that the almost endless varieties of this grass are produced by the pollen of one sort attaching itself to the stigma of another, it may not be too much to presume, that where some few of the best and most luxuriantly growing of the native varieties are planted, and some of the seeds of the best cultivated varieties are sown, the ground will in a few years come to be stored with plants truly valuable, that may possess the quickness of growth of the one, and the permanence of the other.

In the crested dog's-tail, and in many of our other extolled grasses, there is not the number of varieties to be found as in ray-grass, nor are they of the same value as this. In the summer and autumn months they grow freely, and make a figure upon our best grazing lands. The cock's-foot, the tall oat-grass, the yellow oat-grass, the meadow soft grass, and the fescues, are our leading plants. Where the whole of these are combined, they are of great account at one period of the year; but early in the spring, late in the autumn, and in the

winter, the Lolium perenne, with the Poa annua, are found the main support of the pasture.

One of the leading objects of my visit to the north, was to determine more fully respecting the value of the varieties, and the advantages to be derived from as full an investigation as possible of the habits and qualities of both the native and cultivated kinds, in the West and North Ridings of Yorkshire, and so on through Scotland. My journey has been attended with many satisfactory results. In the Ridings of Yorkshire before named, the Lolium was not found abundant any where in its native state; and through a great portion of them, there was a great indifference manifested by many of the farmers, as to the quality of the kind they used in their cropping, many of them having never thought on the subject. A small quantity of good seed has, however, been sent to the banks of the Tees, to several cultivators this spring, (1824), and there will be no fear of its shewing itself in such a way as to make a strong impression, wherever their connexions may extend. Near Darlington, and particularly in the Church-Yard at Haughton, several fine varieties grow in great luxuriance. I selected a few of these, and put them into the garden of a friend, to excite the interest of the place respecting the better varieties of this grass. At Felton, and about Newcastle, Lolium perenne was observed, and particularly on the town moor, of pretty good quality, in some

instances; and in Wooler Church-Yard it was remarkably fine. Here some plants were selected for my friend Mr Jobson, who has, as before stated, paid great attention to the cultivated kinds. On the banks of the Tweed there are many fine sorts, a selection from which I forwarded to the Botanic Garden at Hull, as well as a basket from this place to be grown by the side of those from Lincolnshire, and from the East Riding of Yorkshire.

You will observe that this grass, which in some places has so generally established itself, is in others almost unknown in any of its more valuable varieties, though some of the varieties are found, I believe, almost every where. I wish to impress on the minds of all who may doubt as to the cause of the varying appearances of the plants in different places, that soil and situation, so far as I have noticed, have not so much influence on them as might be imagined. The naturally luxuriant varieties will, of course, become still stronger by being brought into more highly enriched land, and the contrary effect will be produced by a change to a poorer soil; but the plant will still retain its general characters.

In every direction round Edinburgh, the Lolium perenne is a very leading grass; and several of the established varieties to be found here are extremely productive and rich in their foliage. In order to be more distinctly understood by you, I have taken the liberty of sending to you several specimens of

the entire plants, and I shall be obliged by your giving them a place in your garden, so that you may have an opportunity of observing these varieties at leisure, and pointing them out to others. You will find some of them with roots of considerable extent and account, though the foliage be very trifling in comparison, and again, others very slender and unimportant in the root, where the leafing and bulk of the plant are very great. One of them is of a kind which always grows in a sort of tuft, and though it appears of a fine deep green on the surface, yet it will generally be found to have a large portion of dead and decaying leaf within the tuft. Much of this sort is seen in several places in the King's Park. There are three or four subvarieties of it. One of them, the most luxuriant subvariety in the lot, and the other, one of the poorest, were found directly side by side, and many of both kinds were left.

The time of flowering of this plant in Lincolnshire is usually from about the 1st to the 14th of June. Last year it was later by a fortnight. I have one particular kind remarkable for furnishing an abundant quantity of remarkably heavy seed, which was in flower last season fully three weeks before any of the rest. This variety, however, would be of little worth but for its seed. Some of the native kinds are late in giving their culm. Did we wish to make them useful to us in the way of improving our sorts for the convertible

husbandry, it would be necessary to endeavour to bring them to have their flowers to meet those of the stock.

I should hope that many will be induced to try, by every means in their power, to extend the propagation of the superior varieties of this valuable grass; for I am fully convinced that in our pasture land, we may, without much difficulty, and almost without expence, double the value in the first instance. When this is once effected, the further improvement will go on, and the extent of it will be almost without limit. Where grass is constantly depastured with sheep and cattle, it should in all cases provide for itself. All that can be afforded to it is a seeding, where required, and a dressing of compost furnished from itself, in which lime may be advantageously mixed. Nothing from the farm can in general be afforded. In the ordinary way of grazing, it receives every thing in the way of manure that it gives, and this may fairly be deemed its due. But labour may be allowed; and I hope to see the time, when this now so miserably neglected a department of rural economy, will have the full share of attention so justly due to it. I am confident that the value of the superior varieties of the ray-grass, to which I have devoted so much attention, will before long be fully appreciated, and universally known and attended to.

XXXII.

Account of Exotic Plants either partially or completely naturalized at Biel, in East-Lothian.

By Mr JOHN STREET, Flower-Gardener.

(Read 10th July 1823.)

PERMIT me to solicit the attention of the Society to the subject of naturalizing tender exotic plants, 1*st*, By gradually exposing them in the open border, and inuring them to the hardships of our winter; and, 2*dly*, By bringing them to ripen seeds in the open air, and raising young plants from the seeds so ripened. This last is the more effectual mode, as there is every reason to think that, in successive generations, the seedlings become more and more hardy.

I shall name the plants which I consider as either partially or completely naturalised, as they stand in their classes of Don's Catalogue.

Lopezia racemosa.—I cultivate this Mexican plant in the open borders. It prefers a rich soil. It ripens seeds, and has sown itself for some years past. There are several plants self-sown at this time, and these may be considered as nearly naturalized.

Jasminum revolutum.—I planted this Chinese Jasmine in the open ground, against a south wall, in the year 1821 ; and it stands the winter with no other protection: it is now flowering, and it flowered last year. It is an old plant.

Veronica decussata. — I have many seedling plants in the open ground, placed in various situations ; and they were all raised from seeds perfected by plants in the open border here. They have stood the three last winters without any covering very well, and flower profusely, which is rarely the case in green-houses. These seedlings, therefore, are fully naturalized.

Calceolaria pinnata.—I cultivate it in the open borders, in sheltered places, in rich moist soil. It ripens seeds ; and my naturalized plants are now of the fourth generation.

Verbena triphylla was planted in the open ground, against a south wall, in a very dry and poor soil, in the year 1821. Its wood did not suffer from the winter 1822 ; but, last winter, its branches were killed nearly to the ground. It is, however, shooting up again very strong. It flowered very finely the two last summers, and I thought it yielded good seeds, which I sowed last year, but they did not vegetate. It had no covering.

Cneorum tricoccum was planted in the open ground under a south wall last year ; and it has stood last winter without any other protection.

Iris Chinensis was planted in the open border, not near a wall, or any other fence, in 1821 : it

stood the first winter very well, without any covering; but last winter I placed a common hand-glass over it in the worst weather. Its broad leaves are liable to suffer by the wind here.

Pardanthus Chinensis or *Ixia Chinensis*.—It was raised from seed here, and planted into the open borders in 1821, in various soils and situations. The young plants stood the last winter without any protection.

Marica striata.—I raised several plants from seed, and planted them in the open borders. They stood the winter 1821-2; grew more than three feet high; flowered last year profusely, from June to October; and produced abundance of seed. I find they require to be planted deep and firm, for the winds are apt to tear them to pieces. Some of them stood last winter without cover.

Marica Californica, or *Sisyrinchium Californicum*, has been cultivated several years in the open borders here: it stands all weather, flowers several months in the year, produces much seed, and sows itself abundantly. It stood last winter without any protection, and many self-sown plants have already appeared, forming the third or fourth generation. It is now therefore perfectly naturalized.

Panicum Italicum.—I am told that this is cultivated in the fields of Italy, but is a native of both Indies. I received the seeds some years since, sowed them in a pot, and then planted the seedlings in the open borders. They produced plenty of seed in 1821. I sowed the seeds so ripened in

the open border ; and the resulting plants produced seeds, which I again sowed in the open borders on the 28th of March 1822. The plants from this sowing produced seeds, which I again sowed in March 1823 in the open borders. The plants appear promising at present, being now the third generation. A hardier variety of this Panicum may prove a useful acquisition. Small birds are very fond of its seeds.

Briza maxima has been naturalized here for several generations, sowing itself regularly. It is desirable to have a hardy variety, as the plant forms a singular feature in the mingled flower-border.

Scabiosa lutea proves quite hardy, ripening seed and sowing itself: now in the second generation, and sends up flower-stalks ten feet high.

Knautia orientalis has been naturalized here for several generations, and sows itself. The self-sown plants of autumn are always much larger and finer than spring sown ones.

Buddlea globosa was planted in the open ground near a wall with an eastern aspect, more than ten years ago, and had no other protection. It is still a very thriving plant, but does not give perfect seeds.

Heliotropium Peruvianum.—I have reason to think that this admired fragrant plant may ere long be naturalised to the open air of this country ; for a plant stood the mild winter of 1821-2 under a south wall at Biel, without any other protection, and there produced perfect seeds, which I hope will yield a hardier progeny. I wish our gardeners

of the more maritime and mild districts, would lend a willing hand towards naturalising such plants.

Anchusa Italica.—I planted it in the open border last year: it stood last winter very well, and is now flowering very luxuriantly.

Convolvulus major,—varieties, pink, white and purple, &c. have been quite naturalised here for several generations of the plant. I save their seeds every year.—*Convolvulus tricolor*, and varieties, have also been naturalised for several generations, by seeds every year. — *Convolvulus althæoides.* I planted it in the open ground under a south wall in the year 1816: it thrives remarkably well without any covering, and flowers very abundantly all the summer and autumn months. Its roots or suckers run about the border to several feet in extent, and send up plants in various places. These afford by far the readiest way of propagating the plant. Like some other running plants it does not seed readily.—*Convolvulus Cneorum.* I planted it under a south wall in very dry poor soil in 1816; it stands the winters very well. In 1821 it produced ripe seeds, which I sowed in a small pot in March 1822, and kept in the open air. They produced several seedling plants, and I think there are varieties among them. The seedling plants I sheltered last winter, but without any artificial heat, and merely to make sure of them.

Ipomœa coccinea.—I sowed its seed in the open ground under a south wall last year: the plants grew 9 or 10 feet high, and flowered beautifully. They did not perfect seed.

Campanula pyramidalis is naturalised here, and sows itself abundantly: it is now in the third generation.—*Campanula Speculum* or Venus' looking-glass, is quite naturalised: it sows itself plentifully.

Lonicera implexa was planted in the open ground against a south wall in the year 1817: it stands the winter quite well without other protection than the wall; flowers abundantly, and produces seed.—*Lonicera flava* was planted in like manner, and by the side of the above, in 1817; it flowered beautifully last year 1822; and produced seed.—*Lonicera Japonica* I tried in a similar place, but the winter killed it.

Mirabilis Jalapa and *longiflora*.—I cultivate them in the open borders, and they flower and produce perfect seed every year. They sow themselves, and are now in the fourth generation.

Myrtus communis, or broad-leaved myrtle.—I placed several plants in the open ground, near a south wall, in the spring of 1816. They throve remarkably well, and have flowered as freely and plentifully as the hawthorn every season. No artificial heat whatever has been used, but, I cover them in winter with mats.—*Lycium Afrum.* I planted it in the open ground in the spring of 1816, in a situation similar to that of the myrtles, and indeed alongside of them. I treat it in the same way as the myrtles, and it flowers well. In the winter of 1819-20 it was killed nearly to the ground, but it made shoots again in summer very luxuri-

antly, and so it continues. It produced seeds, which appeared good, but they did not germinate. I may here mention, that our myrtle-wall is 40 feet long and about 6 feet high, all covered with myrtles, excepting the single plant of Lycium Afrum just mentioned.

Pittosporum Chinense.—I planted it in the open ground, several feet from the wall; and it stood last winter very well without any protection.

Periploca Græca.—I planted it in the open ground in the spring of 1816: it stands the winters well without any covering. Our plant is more than 20 feet in length. It flowers during the whole of July.

Linum tauricum is often kept as a green-house plant. I planted it in the open ground in the year 1816, and it has survived till this time without any protection: it begins to flower in April, and continues flowering most part of the summer. It is quite of a shrubby habit. It has not afforded any seeds.

Agapanthus umbellatus I planted out in the open ground under a south wall a year ago, and it passed last winter well without any covering.

Amaryllis Belladonna I planted in the open ground in 1817, 3 feet from the wall: it stands the winters very well, and it produced flower-buds this spring.

Sanseviera carnea was planted in the open ground under a south wall in 1817. It has survived the keenest winters hitherto, without cover-

ing: it flowers freely, increases fast by the root, but gives no seed.

Phormium tenax or New Zealand hemp-plant.—I planted it in the open air in 1817, near to a south wall. It has braved the winters hitherto, without any covering. It increases slowly, but I have made more plants from it. It has never offered to flower.

Veltheimia or *Tritoma media.*—I planted this in the open ground, not near to a wall. It passed last winter very well without any covering, and flowered very fine last April: I have one pod of seeds growing at present.

Alstrœmeria pelegrina.—This beautiful plant I placed in the open border several years ago, in deep rich soil, not near a wall or other fence: it thrives remarkably well, producing 6 or 7 large flowers on one stalk: it is altogether much more luxuriant than in pots. It also produces ripe seeds, from which I have raised several seedling plants, without artificial heat. I intend to plant out these seedlings, in the hope of procuring a somewhat hardier offspring.

Hemerocallis cœrulea.—I planted this in the open border, in the year 1817, not near any fence: it has survived the hardest winters as yet, without covering. It flowers freely and produces seeds.—*Hemerocallis alba* has been treated the same as *cœrulea*, but it sends up its flower-stalk so late in the season, that its flower-buds do not expand here.

Œnothera rosea.—I planted seedlings in the open borders in 1817: they stand our winters generally. In the course of several years their fleshy

tapering root gets large. The old plants perished last winter, but all the younger plants stood quite well: it has sown itself, and is now in the third generation. It produces plenty of seed, of which I have gathered several ounces in a year. The soil is rather poor, but on a dry bottom.—*Œnothera fruticosa.* I have cultivated it in the open borders for several years. It flowers plentifully all summer, and perfects its seed. It is allowed to sow itself, and is now in the third generation. I have had no occasion to sow this species nor *rosea* for several years past; the self-sown plants of both being abundant here.—*Œnothera odorata* stands the keenest winters here. It sows itself plentifully, and is now in the third generation.—*Œnothera tetraptera.* This is truly biennial here. It stands the winters, and perfects its seeds next autumn. It is quite naturalized, and is now in the fourth generation at Biel.—*Œnothera villosa* is a showy desirable plant. It also is a regular biennial here. I have cultivated it in the open borders for some years past: it ripens seed plentifully, and is now in the third generation in the open border.

Fuchsia coccinea was planted in the open ground on a dry bottom, near a south wall, in the year 1816: it is in good health now, and produces a few flowers, but has not yet perfected seeds.

Erica mediterranea.—I planted it in the open border, in 1817, about 18 inches off a south wall; and it has survived every winter yet, without any covering.

Persicaria orientalis has been naturalised here for several generations of the plant.

Sophora or *Edwardsia microphylla*, is planted in the open ground, about 18 inches off a south wall. It has survived the winters, but has not flowered yet.

Podalyria virginica.—In the course of ten years it ripened seeds only once, and from these seeds I raised plants, one of which is flowering now.

Melia Azedarach.—I planted three seedlings in the open border; and they survived last winter without cover.

Rhododendron ponticum has ripened seeds here, which I sowed, and raised plants from.

Dianthus superbus.—I cultivate this shewy pink in the open borders: It sows itself, and is now in thefourth generation.

Pyrus Japonica was planted in the open ground, against a wall with a west aspect, ten years ago: it grows well, and is not injured by our winters; it flowers freely late in autumn, and early in spring. I understand it has perfected seeds in some places in England; but its fruit drops off unripe at Biel.

Mespilus tanacetifolius was planted in several places about the pleasure-grounds several years ago: they flowered, and last year produced fruit. The shrub is not injured by our winters.

Mesembryanthemum glabrum.—I cultivate this fine shewy plant in the open borders: it ripens seeds freely; I have gathered an ounce in a year here. It is fully naturalised, being now in the fifth gene-

ration. I sow it in March in pots, and plant it out in the end of May or the beginning of June.—*Mesembryanthemum pinnatifidum* I also cultivate in the open borders : it ripens seeds readily, is now in the fourth generation, and sows itself here.

Rosa Banksiæ.—I planted this fine species of rose in the open ground last year, near a wall : it stood last winter well, without any covering, and is making very long and vigorous shoots from the root.—Several years ago I planted the true *Macartney rose (R. bracteata)* in the open ground, against a south wall, which I think is not the best aspect for it. It was killed down near to the ground in the severe winter of 1819-20; it sprung up again in the spring ; and it stood last winter very well. This species may be increased by layering. —Sets of *Rosa Indica* I first planted in the open borders in 1816 : they do well as rose bushes, and continue very long in flower. There is one against a south wall at Biel now 16 feet high, and clothed with flowers.—The *Red China rose (R. semperflorens)* I planted some years ago in the open ground, in various places : they survive the winter well, and are now large plants.

Calycanthus præcox was last autumn transplanted from our conservatory, in which it had grown to a large size, into the open ground, against a south wall. It stood last winter tolerably well, without any covering.

Rubus rosæfolius, or Madagascar rose, I planted in the open border, against a south wall, in

the year 1817. It has stood every winter yet, and flowers every year, mostly after midsummer. The flowers are white and semidouble. Its wood seems only biennial, or somewhat like to that of the raspberry. Its running roots have extended 7 or 8 feet at least in length, from the place where it was first planted, still keeping at a certain distance from the wall, which is about 8 or 10 inches. It does not seed in our climate; so the only (though perhaps less effectual) mode of naturalising it, must be by taking off suckers, which it produces in plenty like the raspberry, and gradually inuring these to more exposed situations.

Glaucium phœniceum.—I sowed its seeds in the open borders, which produced several plants. These grew strong, flowered last year, and yielded perfect seeds. They survived last winter.

Argemone mexicana.—I sow it in the open borders. It produces seeds every year, and several generations have passed in our borders. In some years it sows itself freely.

Cistus algarvensis.—I planted it in the open ground in the year 1818, at 18 inches from a south wall. It has survived the winters hitherto, without any covering. It flowers freely, and has produced seed, but from which I have not yet procured seedlings.—I planted a shrubby *Cistus* with white flowers, (C. Italicus?), in the open border, under a south wall, in 1816. It survives yet without covering. It has produced plenty of seed, which I sowed in the open ground. It grew and

produced fine seedling plants, and these again have flowered and produced seed in the open ground. At present I possess more than an ounce of the seed thus yielded.—Of *Cistus villosus* I received seeds only last year. I sowed it in a pot in the open air, with a view to naturalise it; and planted several seedlings in the open ground last March. They are doing well.—*Cistus mutabilis*, I planted in the beginning of April in dry sunny warm places. It flowers abundantly in June, and until the end of autumn. A collection of all its varieties of colours and shades, in white, yellow, red, buff and rose colours, I think produces a very pleasing effect, and they flower for a long time during summer. I would choose a dry, sandy, or gravelly sheltered spot.—*Cistus Ledon* I planted in the open border, not near a fence. It survived last winter well without cover.—The Gum Cistus, (*C. ladaniferus*,) has thriven in the open ground here for many years.

Teucrium frutescens, I planted in open ground under a south wall, in 1816. It survived some winters until 1819-20, when it was grown large, bushy and thick, and perished. It was perhaps placed in too rich a soil. It produced seeds, however, and sowed itself. I raised some seedling plants in a pot; one flowered at twelve months old. I sunk it in the open ground, under a south wall, and it stood last winter well without cover. This plant stands much drought, without injury, and it continues flowering from May till Autumn.—*Teucrium fla-*

vum, a shrubby species, I planted in the open ground, under a south wall, in 1816. It has stood the winters yet without cover, and produced seeds, which I have sown and raised in the open air.

Lavandula dentata, I planted in the open border some years ago. It survived mild winters, and perfected seed. From it I raised several plants, which I planted out in the open air. They survived last winter. One old plant in a pot is sunk in the open ground. It stood last winter well without cover, and it is now in full flower (June 7.).

Stachys coccinea.—I planted this in the open border, several feet from the wall, in the year 1817. It produced seed, which I sowed, and obtained plants. These were planted in the open ground, and also perfected seeds. The plants are covered with an empty flower-pot only in the worst weather. They flower much stronger and more beautiful than in pots. Mr B. Page ranks it only as a biennial when kept in pots; but it lives longer here in the open ground.

Marrubium Pseudo-dictamnus. I planted it in the open air, under a south wall, and in a poor dry soil. It stood last winter very well without cover. It withstands drought remarkably well.

Dracocephalum canariense, or Balm of Gilead, I planted out under a south wall in 1816. Its seed soon scattered about the borders, and it sprung up plentifully. I have several large plants about the borders, not near any wall or fence; they are in the third generation in the open air, and survived

last winter without covering. If we may decide by last winter, I really think this species is now hardier than when I began growing it in the open air.

Celsia cretica. This showy plant has been cultivated in the open borders here from the year 1817. It ripens seeds plentifully, and sows itself. The plants are now in the fourth generation. I have not had any occasion to sow it for several years past, as it sows itself readily. It has stood last winter in various places, without any protection. I have seen it 7 feet 8 inches high here. It continues flowering from spring to autumn.

Hemimeris or *Alonsoa urticifolia.*—I have cultivated this Peruvian plant in the open borders for several years past: the plant survives mild winters perfectly well. It produces much seed, and sows itself every year; there are many self-sown plants about the borders now, and these are in the fourth generation.

Digitalis ferruginea.—I sowed its seed in the open border, where it stands the winter without covering, and produces flowers.

Mimulus glutinosus.—I planted this in the open air, under a south wall, in poor shallow soil. It survives the winter, without covering. It produced a good deal of seed last year. I sowed some of it this spring in a pot kept in the open air, and it is growing plentifully.

Melianthus major. This fine large plant has ripened seed here in the open ground. I sowed the seed in the open air, and it is growing; but

the seedling plants are kept in a common frame in the worst winter weather. When they are ready to flower, I intend to plant them out.

Iberis semperflorens, I planted in the open ground, near to a south wall, several years ago. It stood the severe winter 1819-20, and also last winter, quite well, without covering. Last summer it perfected seed, which I sowed this spring, and it is growing. This plant flowers from March until sharp frost set in, at the approach of winter.

Erodium hymenodes. I have cultivated this geranium in the open borders for several years past, where it does very well. It stood the winter 1819-20, and last winter, without injury. It sows itself plentifully, and is now in the fourth generation. It flowers from spring until winter.—*Erodium* or *Geranium Richardi*. I planted this species in the open border in 1816, and find it quite hardy. Last year it ripened seed, and sowed itself in the gravel-walk. The self-sown seedlings are now flowering. I sowed some in a pot in the open air, and they also are flowering.—Of *Geranium anemonifolium*, I raised several plants from seeds in 1817, and planted them in the open borders. They survived the mild winters, and produced seeds. These I sowed under a wall with a west aspect, where they have stood the three last winters without covering, and have flowered from June to October, and perfected seeds. I think such an aspect, which the sun does not strike till about noon, is the best for this and similar plants, for I lost them in other places.

Lavatera trilobata.—I planted this in the open ground last year, near a south wall. It stood last winter very well without cover, and is now about ten feet high, and beginning to flower. It prefers a dry stony situation. Bees seem extremely fond of the flowers.

Hibiscus syriacus.—I raised this from seed, and planted it in the open border some years ago. It stands our winters tolerably well. It showed flower-buds last year, but the season proved too dry, and the flowers did not expand.

Coronilla valentina.—I planted this in the open ground, under a south wall, in the year 1816. It survived the winters until 1819-20. One year it had perfect seeds, from which I raised plants in the open air. I planted one of these seedlings about 18 inches from the wall, and it continued flowering last autumn until heavy snow came, which buried it: when the snow melted, the flowers appeared as fresh as if newly expanded. The plant survived last winter without covering. I think it hardier now, although only in the first generation in the open air. It prefers the driest poor soil, and bears drought well.

Medicago arborea.—I planted several of these in the open ground, under a south wall, in the year 1816, and they have stood every winter yet, without any covering. They flower abundantly nearly all the year, and ripen plenty of seeds. The plant has sown itself, and one of its seedlings stood out in the open border far from any fence during last

winter. I transplanted two self-sown seedlings in rather an exposed place, not against any wall, and they survived last winter without cover. The poorest and driest soil seems to answer it best.

Disandra prostrata.—Of this I planted a seedling plant into the rock-work, and it survived last winter without cover.

Hypericum monogynum.—I thought, from the appearance of the wood, that this shrub might be rather hardy, so I planted one out in an exposed place in the spring of 1821. It stood the winter 1821-2 very well: it flowered last summer, and has passed last winter without covering.—*Hypericum Coris*, I planted in the open border, about 18 inches from a south wall, some years ago. It survived the winter 1819-20, and last winter, without any covering. It produces its small yellow flowers for a long time, till the end of autumn.

Gnaphalium Stœchas.—I planted this out under a south wall some years ago: it grows well, and ripened seeds last year. These I have sown, and a seedling plant stood last winter quite well without covering.

Senecio lanceus.—I planted this Cape of Good Hope plant under a south wall in very dry and poor soil, in the open border, in the year 1816: it has stood the winters quite well without any covering: it flowers abundantly all the summer and autumn, and its seeds are scattered about the bor-

ders, and rise pretty freely. It seems a very hardy plant, but has no great beauty to recommend it.

Aster argophyllus, musk-tree.—This was planted in our conservatory in 1816, and is now more than 20 feet high, though twice headed down; it flowers abundantly, and has perfected seeds; from these I raised several plants, which I believe is a rare occurrence. I have planted out the seedlings, in the hope of rendering them more hardy.

Cineraria cruenta ripened its seed here. I sowed the seed in a pot in the open air, and it grew. I planted one seedling in the open border, several feet from the wall; it survived last winter without any protection; it looks well now.—*Cineraria populifolia* and *lanata*. These produce seeds, which I have sown, and thereby obtained some varieties.

Tagetes lucida.—I raised this from seed several years ago, and then planted the seedlings in the open ground, about 18 inches from a south wall. They survived last winter without covering: they flower much stronger than in pots, and also produce seeds, so that it is in the way of being naturalized.

Passiflora cærulea.—I raised several plants of the common passion-flower from seeds, which were ripened in the open air in England some years ago. Some of the seedlings I planted out against a south wall, where one of them flowered last summer. The plants stood last winter without any covering.

Calla Æthiopica has repeatedly produced abundance of seed, in the open air here. I sowed some

of the seed in the open ground in a very cold exposed place, early last spring, merely covering the spot with an old broken glass-frame. About seven weeks after, 15 plants appeared; some of which grew fast, and others slow. I took them up in the end of December last, and potted them, putting three plants in one small-sized pot. I kept them under shelter till the end of April, and then sunk the pots in the open ground. One of the plants is producing a flower-bud now, though the plant is little more than a year old. I intend to plant them into the flower-borders soon.

Aucuba japonica.—I planted out some plants here in the year 1816: they stand the winters well, and often flower in May.

Cupressus lusitanica pendula.—This plant was kept for the space of twenty years in a little greenhouse, situated in the centre of the stoves at Archerfield. I planted it out, under a south wall at Biel, in the year 1816: it stands the winters hitherto, and has perfected seed. From these I raised plants three years ago; one seedling I planted out as a standard last autumn, and it stood last winter without covering. I never heard of the cypress producing good seed in our climate until this.—*Cupressus thyoides* also perfected seeds a year ago, which I sowed, and they are growing.

Momordica Elaterium or spurting cucumber, was planted in the open borders in 1816. It ripens seeds, and sows itself. It stands the winters well, and is now in the fourth generation.—Common

Gourds, planted under a south wall, have ripened their seeds here, and are now in the fourth generation.

Smilax aspera was kept many years in a greenhouse at Archerfield. I planted it out, under a south wall, in the open air at Biel, in the year 1816: it has survived the winters as yet, though much exposed, and it flowers in September and October. The plant is now eight feet high.

Acacia armata.—I put a plant in the open ground near a south wall: it survived one winter and flowered the following summer; it also perfected seeds, from which I got plants. I planted one seedling in the open ground, eight or ten inches from a south wall: it passed last winter without any covering.

Hyacinthus orientalis.—Our old bulbs, imported from Holland five or six years ago, and restored to perfect vigour after having been forced and flowered in water, produced seeds last year. These I sowed in a pot last February, and kept it under a common frame. I have now eighteen seedling plants pretty strong. They are all from fine varieties. I think that Mr Justice's success in raising fine hyacinths in Scotland might again be realized.

Narcissus Polyanthus.—The old but restored bulbs have produced seeds here, by which I got seedling plants last year; this year I have raised many seedling plants.—*Narcissus Jonquilla.* Old imported bulbs produced seeds last year. I sowed

the seed this year, and have raised many seedling plants.—I may add that I have raised many *Tulip* seedling plants from seeds produced here; but this, I believe, has frequently been done.

Clematis florida was planted out in the open ground against a wall, with a west aspect, ten years ago or more: it passes the winter very well. It is a shrubby plant, and grows nine feet high or more: it flowers every season.—*Clematis triternata.* I planted it out in the year 1816, in the same kind of situation as *florida.* C. triternata is now in flower for the first time here. The *sweet-scented* variety of *C. Flammula* was planted out, ten years ago, against west and south walls, on a dry bottom. The plants have become large, and flower very freely in September and October, when the fragrance is shed all around the place.—The purple Clematis *(C. viticella)* perfected seed here, and its seedling plants flowered last year. They were sown in the open ground. I think this a rare occurrence in this country.

I may add, that I sow in the open borders numbers of annuals usually raised on hot-beds, and have naturalised some of them for several generations, by sowing their seeds every year; as *Nolana prostrata, Zinnia rubra, Senecio elegans.* This last sows itself. One general remark may be made, that plants that can be brought to endure the open air, are much more healthy, clean and pleasing in appearance, than those confined in greenhouses.

XXXIII.

HORTICULTURAL GLEANINGS.

1.

On the Cultivation of the Alpine Strawberry.— By M. Morel de Vinde'. (Communicated by J. A. Murray, Esq.)

For several years (says M. Morel de Vindé), I have enjoyed during six months each season, an abundance of strawberries, which were so beautiful, so highly perfumed, and so equally ripened, that I flatter myself I shall do a service to the admirers of this excellent fruit, in pointing out the simple means by which I succeeded. I may not, perhaps, offer any thing very new, but I shall at least collect the most useful directions which have been already given, and shall endeavour to explain myself with such precision as to prevent the possibility of mistake, in following the method which I recommend.

I was led to my improvement on the culture of strawberries, from reading an excellent notice by M. Morteaux *senior*, member of the Society of Agriculture of the department of Ariége. The description of the variety to be preferred, and of the mode of procuring seed, and of sowing it, I shall chiefly copy from his paper; and shall then give those directions concerning the transplanting and subsequent cultivation, which are properly the results of my own experience.

M. Morteaux, after having given a brief enumeration of the several varieties, the comparative merit of which he had ascertained by experience, concludes thus: One sort only, in my opinion, eminently deserves cultivation,—the alpine or monthly strawberry. It succeeds on every sort of ground, but it thrives best in a light, sandy, fresh and substantial soil. The fruit, which is generally long-shaped, although sometimes roundish, attains a good size, and, in perfume, rivals the strawberry of the woods. There is a white variety, of sweeter taste and more delicate flavour. Both varieties flower immediately after the last frosts in spring. They continue to bear fruit until the approach of the autumnal frosts, and even then, if put into a greenhouse of a moderate temperature, will afford fruit through the whole of the winter. In the open air their fruit season lasts almost six months, in four of which they produce a full crop.

But, as all plants when removed from their original soil and climate are continually changing their nature, this strawberry, in three or four years, degenerates and produces fruit only for a short period. It is therefore inexpedient to propagate it by runners, as by this mode the existence of the individual plant is merely prolonged, at the expence of the other good qualities of the variety. The only sure way of preventing it from degenerating is to reproduce it frequently from seed.

Ripe seed may be procured in two ways: 1*st*, During the first year the plants have produced fruit, collect a sufficient quantity of well shaped and well ripened berries, and the best time to do this is towards the end of the full crop, that we may be sure we have got the proper sort, and that we have not gathered the seeds either from degenerated plants, or from other varieties which may have intruded into the bed. Put these berries upon a plate, and set them in a dry place out of the reach of mice. They will there decompose and dry up. No danger is to be apprehended from the berries becoming putrid or mouldy; for the decomposition of the pulp tends only to perfect the seeds. The strawberries thus dried are to be kept till the following spring, when, by rubbing them between the fingers, the seeds may be easily separated from the remains of the pulp, which may be thrown away as useless, and then the seeds will remain unmixed and almost perfectly clean. Or, 2*d*, Take

the strawberries, selected as in the former case, and squeeze them in a hair searce or sieve of a pretty close texture; pour water upon them, shaking and separating them at the same time with the hand; press them against the searce, and in a short time the diluted pulp will pass through, and leave the seeds. These may be either sown immediately, or kept in a dry place until the spring.

In preparing for sowing the seed, make a hot-bed of coarse litter; cover it with about six inches of good well wrought soil. When the first heat of the bed is nearly spent, sow the seeds rather thinly, press the earth gently with the hand, and spread over the bed a light covering of moss (hypnum and sphagnum), which may be held down by rods extended along it, and water it moderately. Continue occasionally the moderate watering, so as to keep the seeds fresh. The moss possesses the double advantage of protecting the plants which come early, and of preventing the watering from ruffling and hardening the earth. As soon as all the young plants have vegetated, which will take place in thirty or forty days after they have been sown, take off the moss. It is now proper to shade them from the heat of the sun, and also to protect them from the cold of the night by means of mats. Water them only when it is necessary, and with a very small rose, that the water may fall in a fine shower.

The operation of transplanting the seedlings may be performed at any time, except at the end of

autumn and during winter. The plants should not be lifted till about nine weeks after they have appeared above ground, which is about fourteen weeks after the seeds have been sown. The ground on which they are to be planted should be well enriched with old hot-bed dung; for before being called upon to produce fruit for three years successively, they require an abundant store of nourishment to be laid up for them.

They should be planted in beds 4 feet broad, that the fruit may be gathered with facility, and the plants dressed, without risk of being trodden upon. The stools may be placed in a regular quincunx order, one foot asunder every way. There will thus be four rows in each bed, the exterior rows being planted each half a foot from its edges. To make a strong and handsome tuft, three or even four plants, if they are weak, may be put into each hole. After this they must be frequently but moderately watered, and always with a rose.

It is of course requisite to keep the strawberry beds free from noxious weeds. But it is still more important, nay, even absolutely necessary, to cut off the runners, which, creeping about, overspread the ground with young plants. Nature, always more occupied in propagating the species, than in perfecting the beauty of the fruit, seems to affect this mode of reproduction, and lavishes a great part of the sap upon the runners, to the essential

detriment of the fruit. I have found, from long experience, that those plants from which the runners have been regularly cut, are three times more valuable in the quantity, quality, and duration of their produce, than those whose runners have been permitted to range about at freedom. The removal of these excrescences ought to be carefully and completely effected, at least once a-week. If this is neglected, the fruit will degenerate, and even the original plants will soon become weak and go off.

Strawberry-beds thus managed produce excellent crops for three years successively, after which period it is proper to renew them in the manner explained above; and, for that purpose, it will be found desirable to plant one-third of the beds required every season, and, at the same time, to destroy the third part which has already produced fruit for three years

2.

2.

On the Cultivation of Asparagus, as practised in the neighbourhood of Marchienne, a town in French Flanders, noted for producing the finest Asparagus in France. (Communicated by the Chevalier MASCLET.)

THE following method differs in some material points, from that, an account of which was read at the meeting of the Society of January 11. 1816, and published in its Memoirs, volume ii. p. 347 *et seq.*

The season for planting asparagus is March or April, but the latter month is more favourable. A pit is to be dug in the most sunny exposure. The surface is divided into beds, five feet wide, and two feet distant from each other. Each bed being dug two feet deep, the bottom is covered about a foot thick of horse or cow dung nearly rotten, well and equally trodden down on the whole surface. The dung is covered with two inches of light garden mould.

The roots are then disposed two feet and a half distant from each other, at one foot from the edge of the bed, in the quincunx order.

The roots are covered an inch thick with earth, on which are laid two inches of dung, or good hot-bed soil; and at last two inches more of mould. That the earth may not be unequally pressed, or

partially condensed, a slight board is used for treading on.

During the two first years after planting, the shoots should not be gathered for use, that the plants may gain strength; for should a single shoot be cut during that interval, it would materially hurt the plant, not only in preventing its acquiring its natural size, but also in shortening its duration. A bed well managed may last at least from twenty-five to thirty years.

In the two first years the plants must be uncovered, about the end of November, down to the bud or top of the shoot, and covered again with five or six inches of good rotten dung, and left so till the month of April. The earth taken out in November, which has remained, during the whole winter, on the sides of the bed, and has been of course improved by the action of the atmosphere, is to be thrown over the plants again in April, to the depth of six inches.

After these two first, and during the following years, the beds are likewise uncovered every year in October; and immediately after Easter they are covered again, with at least a foot of good well sifted mould, that the asparagus-shoots may grow longer. It seldom happens that the plants fail when thus managed, and when the dung, before the planting, has been well and equally trodden in; but should this be the case, they may be replaced by others, which must be treated in the same way as above directed.

The most eligible roots for planting are incontestably those of one year, having only one or two buds. Experience has proved, that those of two or three years old should not be employed.

It is a great advantage to be able to procure that kind of light peat soil, mixed with fine white sand, which is found on the surface of heathy grounds. It is most usefully substituted for the external coverings of the beds, in preference to a stronger and more compact earth; for the asparagus vegetates more quickly in a light soil, is more tender and succulent, and is, besides, more easily gathered. The shoots should be cut, or rather gathered, either before sun-rise or after sun-set.

In gathering, it is found best partially to uncover the plants and to break off the asparagus-shoots near the root, rather than to cut them. Many advantages attend this method: the work-people do not run the risk of cutting the heads of one or more shoots, which are not yet come to the surface of the earth; or of wounding the buds of the roots, which are apt to perish, when damaged by the point of the knife. This way of gathering has been found also more expeditious: besides, thus moving the earth round the plant keeps it lighter, and lets in more easily to the roots the dew, the rain, and the heat of the sun, which tend to produce larger asparagus, and in a greater abundance.

They break all the asparagus-shoots in the following manner: When the shoot has been tho-

roughly uncovered by the hand, they lay hold of it, advancing the first finger and the thumb to the root, and break it easily from the eye or the joint of the root, which is immediately covered again with the same earth.

Additional Observations on the Cultivation of Asparagus. (Communicated by the same.)

There is a diversity of opinion among the growers of Asparagus at Gravelines and Marchienne, in French Flanders, whether they should be planted on a ridge, or in flat beds. Those who are in favour of the ridges give as a reason, that the surface of the earth being thus more exposed to the influence of the atmosphere, is rendered lighter and more friable; which is particularly advantageous to the growth of the asparagus. The others argue that, each plant requiring an equal share of rain and dew, those, who construct their beds after this manner, must perceive that the asparagus shoots, which grow on the top of the ridge, are neither so plentiful nor so large as those on the sides, which imbibe and keep a greater quantity of moisture. On high and dry ground, they find it often advantageous to sink the beds three or four inches below the level of the soil. When it is decidedly damp, the bed must be kept on the level of the soil, or even a couple of inches above it; as nothing is so prejudicial to these plants, as when

their roots are long drenched in water. The surface of the ground however, should not be either too wet or too dry; although the first is less hurtful than the latter; as it is known that asparagus grows wild on the muddy sea-sand, and on alluvial grounds, constantly refreshed by adjoining rivers.

Although every means should be employed to render the earth as light as possible, I am not at all of opinion that sand should be made use of; light peat soil and wood-ashes are much better. When the earth is regularly well manured every year before the winter, the ground cannot but become lighter and more friable within a few years. Wood-ashes especially produce that effect, and enrich the ground, whilst it must be empoverished by adding sand.

Asparagus seed is sown in October, November, and December. The seedlings are to be transplanted, either in one of those three months, or in March and April; the latter being the safest in cold and damp climates. The transplantation is to take place after the first year, rarely after the second, and never in the third. The seed is dibbled in, two inches deep, and six inches asunder in every direction. The most suitable soil is a compost of well sifted earth and completely rotted dung, well mixed together, and resembling a light garden mould.

A single grain produces two or three asparagus-plants, bound together, from which the stronger

shoot should be separated, when transplanted. Were they planted together, they would grow in a cluster, produce very little, and last but a few years. As already remarked, the roots should be disposed two and a-half feet distant from each other, and not, as recommended by some, at only eighteen inches asunder. Such a close planted bed could not continue to be productive above ten or twelve years, whilst the other would last for twenty-five or thirty years.

It is absolutely useless to give the depth of four feet to the bed, by successive layers: the half of the materials proposed to be laid for its formation, is quite sufficient, provided the last layer be of good substantial dung, and the inferior ones evenly trodden on. Each annual crop chiefly depends, as to the quantity of the produce, on the proportion of the manure spread on the beds before winter; and none proves so efficient as fresh dung from cattle-stables and shambles.

Instead of that spadeful of fine sand, to be heaped up on each plant, in the form of a mole-hill, and of those four superficial inches of sand which Dr Maccolloch proposes to lay on the beds, before winter, we advise to employ the same quantity of fine mould, and to dispose it in the same shape, but to quite another purpose. We are likewise of opinion, that the roots should be spread as wide as possible, not under, but on the top of the raised up mould, taking care to place the bud of the shoot in the centre. The plant is

then to be covered, first with a full inch of good earth; after that with two or three inches of very rotten dung well scattered, and with a full layer of two inches of well sifted mould.

The cutting, or rather the breaking of the shoots, should cease about the end of June: and the stems, when the seed-shells are quite red, are to be cut down close to the ground, about the end of September; and immediately covered with a couple of inches of sifted earth mixed with dung; not so much indeed to defend the asparagus (a hardy plant) from the frost, as to feed and nurse the roots.

P. S.—Several persons having expressed the desire of obtaining plants and seeds of the genuine Marchienne and Gravelines Asparagus, I have procured some from a trusty correspondent in France, and have placed them in the hands of Mr Peacock, Leith Walk, who has promised to pay every attention to their cultivation.

3.

On the Cultivation of French Beans.—(Communicated by the Chevalier Masclet.)

One of the best kinds of French beans (haricots, *Phaseolus* L.,) is cultivated in the neighbourhood of Soissons, in Picardy. When ripe, they are white, flat, rather large, and covered with a thin pellicle. They are eaten either green, in the pod (haricots verts), or when fully ripe and dried (haricots blancs.)

French beans require in general a light, substantial, and rather moist soil, in a warm and airy situation. They succeed likewise in a dry soil, provided it has been previously well manured with cow-dung; they even ripen sooner, and are least liable to be hurt by the frost. They are averse to any kind of marshy ground. A continuance either of very dry or very wet weather, and likewise high winds, are prejudicial to them.

The earth must be well dug, and manured with good rotten dung, a few days before the beans are planted. Crops are planted in succession, commonly every fortnight, from the end of the frost to the beginning of the great heats of the summer.

On beds, 5 feet wide, separated by a path, they dibble in the beans in rows, sometimes one by one

at a time, but more generally five or six together, to make what they call a *touffe*, or cluster. These are a foot distant from each other, and disposed as a quincunx. The distance, however, varies according to the nature of the soil; but it is better to have it large than too much contracted, that the clusters may have more air, and for the more easy application of the horse or hand hoe. A French arpent may contain about 12,000 of those clusters, out of 17 lb. of seed; and the return has sometimes amounted to 50. They never sow their beans broadcast. It is not unusual to have them soaked twenty-four hours before they are planted. The beans are dropt in a hole an inch deep, if the soil is clay, or deep loam; and a little deeper, if light or sandy. They are apt to rot in the ground if they are not enabled to vegetate speedily, by the combination of solar heat and moisture. To prevent the rotting of the beans, some gardeners, after having dug the hole with their hand-hoe, drop in five or six beans, and cover it at first with hardly an inch of earth, leaving the rest they have dug up on the side. After the beans have actually sprouted, they level the mould over them.

When the first green leaves are two or three inches out of the ground, the hand-hoe ought to be employed for the first time between the rows, to stir the ground, clear it of weeds, and earth up the plants. All the weeds that grow among the beans, out of the reach of the hoe, should be pulled up by the hand.

The same operation is to be renewed when the beans begin to blossom; and, for the last time, a month after.

A little before they apply the hand-hoe for the second time, they place support-sticks so that they may meet at top, always taking care to destroy any fresh growth of weeds, and to earth up the roots of the plants on each side.

After the third hoeing, they pinch off the top of the plants, to prevent their further growth, and to promote their flowering.

XXXIV.

On the Destruction of the Caterpillars usually found on Gooseberry and Currant Bushes.

By Mr Alexander Bisset, Gardener at Methven Castle.

(Read 2d September 1824.*)*

As the various ways which have hitherto been employed for destroying the Caterpillars that infest gooseberry and currant bushes, have, in a great measure, proved ineffectual, I take the liberty to lay before the Society an account of a method which I have from experience found to be both efficacious and of easy execution.

It is a fact well known to practical gardeners and amateurs of horticulture, that confined tobacco smoke is more or less destructive to a great variety of insects, but more especially to those of the fly tribe; hence I wished to contrive a method for the effectual application of tobacco smoke upon gooseberry bushes for promoting the destruction of caterpillars.

I shall first give a description of the simple ap-

paratus used for confining the smoke, and of an undercloth upon which the insects are made to fall. The frame of the apparatus is made of hoop-iron, consisting of four circular hoops, placed horizontally at equal distances, and lessening gradually in diameter towards the top: the undermost hoop of the frame is made of slight bar-iron, purposely to strengthen the apparatus and keep it circular. There are also four pieces of hoop-iron, crossed at right angles at the centre, and bent over the circular or horizontal hoops. These are pierced where they intersect each other, and fastened together with iron-rivets; thus forming a frame of a hemispherical shape, six feet and a half in diameter by three feet in height;—a size which is proportioned to my full grown bushes. The kind of cloth which I have adopted for covering the frame of the apparatus, and confining the smoke, is strong pack-sheet, fitted and sewed after the manner of an umbrella; but it is necessary that this kind of cloth should be painted on the outside, to prevent any of the smoke from escaping.

The square measurement of the cloth which is used for spreading under the bush should considerably exceed the diameter of the apparatus; and from the middle of one of the sides the cloth is cut half through, and one of these sides is made to overlap the other by joining a piece of cloth to it, so as no space may be left uncovered.

From the description of the apparatus now given,

it may possibly occur to the Society, that the furnishing of hoop-iron and pack-sheet, together with the workmanship, may be altogether too expensive for the object in view. I may therefore state, that the expence of iron-hoops and cloth, adding thereto the workmanship of both, amounts to only L. 1 : 2 : 6, exclusive of painting. But if that expence should be considered too great, I shall here take occasion to lay before the Society a cheaper means of furnishing the apparatus, but more especially for smaller bushes than those referred to above. There were in the garden under my charge a considerable proportion of young gooseberry bushes, and these more liable to the ravages of the caterpillar, from their healthy and luxuriant growth than those which are old and stinted; consequently they were first and most severely attacked. In the process of smoking such young bushes, I found it would be more expedient, and also more expeditious, to have a smaller apparatus. I therefore made a frame of wooden hoops after the same manner of the iron one, the size of which I proportioned to my younger bushes, and found this to answer the purpose equally well. No outlay was incurred excepting for the cloth, which cost four shillings. But, notwithstanding the difference in regard to expence, at least in my view, the iron hoops are most suitable for the purpose, as the apparatus, if kept with tolerable care, will last many years.

In further compliance with the suggestions of the Secretary, I shall now proceed with a full description of the whole process of fumigation, together with a few hints on the nature of the usual gooseberry caterpillar.

I first, if necessary, clear away the soil from the stem of the bush, and afterwards smooth it well with the back of a spade all underneath, so as the undercloth may lie quite flat and close to the stem: in case that any of the under-shoots might rest upon the cloth, they should be propped wih forked sticks prepared for that purpose. As the smoke naturally rises from the surface, if the precaution of propping up procumbent branches were neglected, the animals which might happen to be upon the points of the shoots might probably escape. The apparatus is then put over the bush, and should rest entirely upon the under-cloth. The tobacco smoke is immediately applied by means of a pair of fumigating bellows, the pipe of which is admitted through a hole which is pierced for that purpose in one of the hoops near the bottom of the apparatus. The smoke may be otherwise applied with good effect, by having a small lid to open from the bottom hoop, to admit of a middling sized flower pot, in the side of which a hole should be pierced. The pipe of a common bellows may be applied with equal success. In this case the tobacco should be kept very damp with moss (*hypnum,*) which, if dry, should be dipt amongst water. This pre-

vents it from getting into flame, and causes a large body of smoke to arise. Fumigating bellows being the most economical in the saving of tobacco, and being furnished with a pair for other purposes, I have consequently used them in preference to adopting the other way. A few minutes blowing fills the cavity of the apparatus with smoke, which is allowed to remain in that state for the space of five minutes more. If an additional under-cloth be provided, and the next gooseberry bush be duly prepared, the apparatus may, by keeping it steadily in a vertical position, be lifted from the first and placed over the second almost full of smoke. The caterpillars will be found lying in a state of stupor all over the under-cloth; they are then taken away on the cloth and destroyed. They may be burned, or buried, or given to poultry. I find it is proper, in general, to shake the bush, to cause all the caterpillars to fall down. This should be done smartly with a stick, prepared with matting on one of the ends for that purpose. A few of the animals perhaps may fall from the higher part of the bush, and rest upon the foliage of the under branches. This ought to be guarded against, by close inspection. In place of using the under-cloth, some may, perhaps, rather approve of beating and smoothing the ground all underneath the bush previous to smoking; and then, after the caterpillars have fallen from the bush, killing them, and burying them on the spot.

It may here be remarked, that there are different species of fly which fall as well as caterpillars, among which are the caterpillar-fly; and such being the case, the under-cloth must certainly be allowed to be the most effectual method of securing the destruction of all the insect enemies. It is also necessary that great care should be taken in lifting the cloth, lest any of the caterpillars should fall off.

Regarding the expedition and expence of the process, I may mention, that two people are required in preparing for, and performing, the operation; and are able to fumigate upwards of 80 full grown bushes in a day. They would be perfectly able to do upwards of a hundred of younger or half grown bushes in the same time. A pound weight of tobacco, if well managed, will smoke upwards of 140 full grown bushes. If, therefore, the privilege to grow tobacco for the use of the garden, were attended to, the expence would be rendered very trifling.

I have traced the usual gooseberry caterpillar through all its stages. So soon as it changes into the fly state, it deposits nearly 100 eggs within the space of 48 hours. In a few days afterwards come forth the caterpillars. The most common currant-bush caterpillar is a larger animal, and its fly a variegated moth.

I may here observe, that the females on their first appearance in the fly state, have very large

bodies; and, until they deposit the greater part of their eggs, it is with much difficulty they are able to fly from one bush to another: were they able, while pregnant with such a numerous breed, to fly to any great distance, they would, in this case, become universal, whereas, for the most part, they are confined to certain districts: this may account in a great measure for the locality of caterpillars.

The chrysalids of the latest breed of caterpillars of the season, are to be found throughout the following winter in the ground, at a small depth under the bushes. It may also be safely asserted, that they remain in that state, until the bushes resume their leaves, when they change into the fly state. They may also be found in the crevices of the rough and mossy bark of old bushes, but they are seldom found in that situation. Thus, removing the soil, and scraping the mossy bark off the bushes, together with the immediate application of lime-water, (all of which have been already recommended to the Society), will be found a very powerful preventive against the increase of gooseberry caterpillars.

On finding early in the season the bushes attacked with a breed of caterpillars, it might not be judged necessary to destroy them by fumigation owing to the small extent of the breed; but even these, allowed to arrive at full growth, and afterwards to undergo all the changes natural to the insect, there would, in the space of four or five weeks

after the animals leave the foliage, come forth as many flies as there were caterpillars before, and, consequently, would increase in the same proportion as before specified.

I have stated these facts, with a view to shew to shew that chrysalids are under ground at this season of the year also, and may therefore be removed according to the method above referred to, at about three weeks from the time the caterpillars leave the bushes, which may be easily ascertained, by observing when their cast skins appear upon the foliage. If the method of removing the soil, in this case, were adverted to, this would greatly diminish the second breed, which are always the most destructive; and, in general, the destruction of them cannot be accomplished without resorting to fumigation.

The above remarks, on the nature of gooseberry and currant-bush caterpillars, now laid before the Society, have been the result of minute investigation, in reply to the queries of Mr Neill.

XXXV.

On the cultivation of the Potato, with an account of the Kilspindie Bloom.

By the Rev. Dr Antony Dow.

In a Letter to the Secretary.

(*Read* 10*th June* 1817.)

I have been for more than twenty years in the practice of sowing yearly some potato seeds, and examining carefully the qualities of the potatoes produced. My first attempts in this way were with the view of obtaining some new kinds that might prove less liable than those in general use, to the disease called Curl. In that, however, I have failed. For, though I have sometimes obtained a potato that continued free of curl for a greater number of years than others, or than the common white potato of the country, yet all have at last, in the course of six years at most, become liable, less or more, to this disease, so destructive to our potato crops in this part of the country (Kilspindie).

I then turned my attention to the obtaining of a variety of the potato, that might combine in it some of the best qualities of our common potatoes, such as earliness, dryness, productiveness and soundness in keeping. Many hundreds of seedlings have I raised with this view; and after bestowing much pains, and submitting to great labour and trouble in selecting, keeping separate and distinct, and making trial of the different kinds, for three, four, or five years, I have found myself again disappointed. Still, however, I have persevered, though I found it necessary to contract the scale on which I pursued my object; and I have only procured one seedling kind, which I have thought worth cultivating to any extent. It was raised from the seed of a potato which I had some years ago from the North of Ireland, under the name of the *Bloom*. Hence I have distinguished the seedling by the name of the Kilspindie Bloom. I think it bids fair to succeed, and I trust to have the pleasure of seeing it bloom and flourish as one of the common potatoes of its native district. I have now planted it three successive seasons, since raised from the seed. Hitherto it has done well, being generally from one to three weeks earlier than the common potatoes of this country; while it is remarkably prolific, and also keeps well. In a plat of my garden, measuring sixteen by eight and a-half yards, planted last spring with one peck of this potato, I had three bolls and two pecks,

being at the rate of more than 130 bolls per acre. The boll was measured in the Linlithgow barley firlot, run on from the gathering basket, what would lie without building. I had, also, a few drills of the same potato planted in the field ; and, out of four different varieties of potatoes, planted in the same field, the Kilspindie Bloom was by far the best. The exact produce of these drills, however, I am unable to state, having neglected to measure them as they were taken up. Though the potato is dark skinned, the flour, when scraped or ground, is light coloured, and the flesh I have hitherto found uncommonly fair and beautiful. This year (1817) however, it is not so fair. But this does not surprise me ; seeing the whole of my potato crop of last year, which contains many varieties, is all of a much yellower hue in the flesh than usual, owing, I presume, to the uncommonly wet and cold summer.

As I am writing on the subject of potatoes, perhaps I may be forgiven, if I take occasion to mention an experiment I made last season (1816) on my potato crop. I mention it rather with the view of exciting some of our members to carry it farther, than with the hope of proving the utility of the practice it would suggest. It was suggested to me by the paper of Mr Thomas Dickson, in the 1st Number of the Society's Memoirs. Of each of the four different kinds of potatoes mentioned above, as planted in one field, two drills were

planted with cuts off the wet end of the potato, one single cut in general being taken off each potato, containing the cluster of eyes at that end. The remaining portion of the potato was used in the house for the table, and was found, after keeping some weeks, to be no worse for being cut, but, on the contrary, superior, on account of having been deprived of the wet end, and the dry only left. In three of these four kinds of potatoes, the two drills of wet cuts were evidently a superior crop to the others, which were planted in the usual way, with all the cuts indiscriminately. In the fourth kind, I was unable to distinguish any difference. The superiority of crop in the two drills of wet cuts, consisted in the largeness and equality of size of the tubers, and by no means in the number; for, quite contrary to the common idea entertained here, the cut off the wet end, containing a multitude of eyes, produced larger tubers than those cuts which had only a single eye.

At the same time, it is but fair to mention, that Mr Archibald Gorrie at Rait, whom I requested to make the same experiment last season, reports to me, that he did not see much difference between the produce of the wet cuts and those of the others.

KILSPINDIE,
28th February 1817.

Farther Particulars, contained in a Letter to the Secretary, dated Kirkpatrick—Irongray, 28th February 1825.

(Read 7th April 1825.*)*

In answer to your queries about the Kilspindie Bloom, I have to say, that I continue to cultivate it, and have now no other potato, (save a few now and then on trial), in the field; for without exception, it is the best eating potato I have yet seen any where. But in this poor gravelly soil, the crops are not like those I had at Kilspindie; and I must candidly notice to you, that it does not take here. I have only one neighbour, a heritor in the parish, whom I have got to cultivate it; and his family are so fond of it, that he plants no other for home use; but he tells me, that, in the market of Dumfries, the people will not look at it. This is mere prejudice, and foolish prejudice, against the colour, I presume; being like to an old worn out potato, which they once had here, but have given up. The Bloom does not succeed on heavy damp soils; but on loam, whether light or rich, or on any other good dry soil, is very productive. It weighs heavier than most other potatoes, and has more gluten or starch than any kind I have met with.

In answer to your queries about my mode of

preserving potatoes, I never practised *cutting* out the buds to preserve potatoes over winter. I merely rub off the shoots with the finger, or, if necessary, press them out with a blunt-pointed stick. I still keep up my practice of turning the potatoes in spring out of one pit into another, clear and pure; and when so cleared of all shoots, or spoiled ones, water them as put in, covering the surface with turf, the green side next the potatoes, and then heap on two or three feet of earth to keep out the drought and heat. This process I repeat twice or thrice, according to the heat and dryness of the season; and I thus have always good eatable potatoes till September.

Whether it be owing to a certain degree of oxide of iron, which I find mingled in my gravelly soil here, I know not, but I have not been so successful in keeping them here as at Kilspindie. However I still persevere, because I think them better than when not so treated.

The Bloom cannot be called an early potato; yet it is ripe two or three weeks before any other late kind, and therefore desirable, as I can always have it up and stored before there be the least chance of frost. It boils perfectly dry and mealy in September, and is ready to be taken up in the middle or end of that month.

I have another new seedling potato, to be tried in the field this season. I have had it two years

in the garden. Last year it produced a very abundant crop, and ate well. If it succeed equally well in the field, I shall consider it an acquisition. It is a pure white kidney, smooth skinned, and of a sufficiently large size. Neither is *it* properly an early potato, but it is earlier by a fortnight than common late potatoes

XXXVI.

On the Cultivation of the Potato.

By Sir George Stewart Mackenzie, Bart.

In a Letter to the Secretary.

(Read 7th April 1825.)

I now send you a few remarks on the cultivation of the Potato, to which I have paid a good deal of attention, and am still going on with my experiments. About ten years ago, finding the varieties cultivated in my neighbourhood not particularly good, and having been disappointed in the qualities of several that had been recommended to me, I directed my gardener to raise some from seed. Out of a great number of seedlings, one was selected, which has proved the best potato I have ever seen in my own garden and fields. It is fit for the table in the first week of July, is ripe in the middle of September, and is as good ten months after as when first taken up, ordinary attention being paid to it. It is not very prolific ; but labour-

ers have declared that it is the only potato that ever satisfied their hunger, one meal of them being equal to two of other potatoes. Yet the poor people will not cultivate them, preferring mixed and very bad sorts. This potato of mine I have from time to time distributed; and have found, that while it succeeded in some places, it became watery in others. This is the case with many sorts; and the experience of others, as well as my own, leads me to the conclusion, that every one should raise potatoes from the seed until he procures one suited to his soil and situation. I am inclined to think that the longer any variety is cultivated, it becomes less and less prolific; but I cannot yet set this down as a positive fact. The following are the requisites to be sought from a potato.

1. The colour of the skin is indifferent, but the flesh when boiled should be white. I have had very good potatoes of a yellow hue, but white looks best on the table.

2. In general a rough skin indicates a dry farinaceous tuber.

3. The shape of a table potato should be flat; because the thinner the tuber, it is the more easily boiled; or a cylinder, or a ball of moderate diameter.

4. The eyes should be few, and not deep; for when the eyes are deep, much of the farinaceous portion is lost in removing the skin.

5. It should not burst in boiling. This is a very rare quality in dry or mealy potatoes; but it is a

most important one. I have one seedling which promises to possess it; but its other qualities as to keeping and season are not yet ascertained.

6. It is scarcely to be expected that we shall find a potato very early, and at the same time a good keeper. Yet no one should despair, and I do expect to find one that will be fit to be taken up so that wheat may be sown after the potato-crop by the middle of September. This is an object to be kept in view. But it is more likely that we must have one variety for appearing early at our tables, and another to be early ready in the field, and fit for keeping.

7. The size of the potato for the table should be moderate, rather small; that for cattle, large. It is probable that the potato may in time compete with the turnip for feeding cattle, particularly during the spring months.

When we raise a great number of seedlings at one time, it is astonishing how great the variety is in the quality and shape. I raised many hundreds last season, and the shapes of some are very curious. Some of them are singularly bent and curved; and I had one which had embraced another, so that it looked like a very large grub in the act of devouring the other. Sometimes only a single very small tuber is found at the root of a seedling; but this is no indication of its powers of reproduction; for, from a single tuber, the only one produced from the seed, and about the size of a filbert, I had 120 tubers the following year; and

this is the variety that boiled without bursting. Frequently not a single tuber is found at the root; and I have observed that the strongest plants, such as flower from the seed, are in general without tubers. The tubers attached to seedling plants vary much in size; some being no bigger than peas, and some four inches long, and of all intermediate sizes. I should have mentioned, that if a potato possess all other good qualities, the more prolific the better. But a fine potato should not be rejected because it is not prolific, especially for garden culture. With respect to nutritious quality, a good dry potato is worth twice its weight of a watery kind. So far as I have observed, a potato that boils dry when it is taken up, keeps better than any other. Some have been obtained that are best some months after they have been taken up and stored; but in general, when seedlings are raised, I would recommend that they should be tried the second year, as soon as they are dug from the ground, and only the dry well tasted ones kept, to ascertain how long they will remain sound. The earliest varieties may be distinguished by the decay of the leaves and stems; and when the seedling tubers are planted the second year, the roots may be examined from time to time, in order to discover such varieties as are likely to be fit for the table at an early stage of their growth. When any one is desirous to raise seedlings, he should select the apples from a field or garden where there are several

varieties growing; or plant several sorts together, one cutting of each, and save one apple from each plant well ripened. The apples should be kept till they begin to decay, when the seeds may be taken out and dried on blotting-paper. In sowing, the seeds should be dropt about a foot asunder, in order to keep the sorts distinct. Every tuber taken up should be planted the second year, in order that if any variety turn out good, a proper supply may be sooner obtained. The very smallest tuber, even those less than peas, if carefully kept, will yield good plants. I am aware that the tastes of many persons lead them to prefer waxy or watery potatoes, and this is an additional argument in favour of every one taking the trouble to raise potatoes for himself.

I am inclined to the opinion, that the greatest produce will always be obtained from planting the small potatoes whole; but it requires more exact experiments than have yet been made, to ascertain whether this is preferable to the use of cuttings. Too little attention has been paid to this most valuable root; and the varieties have not been kept separate with sufficient care.

In trying potatoes by boiling, no particular care should be taken, as it is of importance that the cook should have as little to attend to as possible. A potato that will boil dry without bursting, is independent of the cook.

COUL,
Jan. 25. 1824.

XXXVII.

Account of an easy mode of Forcing Rhubarb.

By Mr JAMES SMITH, Gardener at Hopetoun-House.

In a Letter to the Secretary.

(Read 7th June 1821.*)*

SIR,

AS every improvement in the cultivation of culinary vegetables seems interesting to the horticulturist of the present day, I beg leave to lay before the Society, an account of a method of forcing Rhubarb, which is so simple and easy, that it may immediately be put in practice, wherever any kind of forcing is carried on.

A large quantity of rhubarb, (chiefly Rheum hybridum), is always cultivated in the garden at Hopetoun House, for supplying the family with young stalks for tarts. Very early in the season this year, from the middle to the end of January, a parcel of these plants was taken up, and placed, some entire and others divided into several pieces,

in boxes filled with light soil, the plants being placed as close together as possible. The boxes were about three feet long, eighteen inches wide, and fourteen inches deep, and had some holes perforated in the bottom. Having been watered to settle the soil about the roots, they were placed in a mushroom-house, in a temperature kept from 56° to 60° Fahr. As they had here to stand on the flues, they were elevated on bricks. The plants immediately began to push out shoots. Two boxes were found sufficient at first; and as soon as these were ready for cutting in February, other two were planted and placed in the same situation. Slight waterings were applied when necessary. In this way a supply was afforded, until the rhubarb out of doors became fit for use. About the beginning of May, the boxes were altogether removed, and the plants put into the open ground; and although the roots were much weakened by forcing, yet I believe the plants will again be ready for the same process after the interval of a year.

From this mode of cultivation an abundant supply of rhubarb-stalks is procured, of a quality much superior to those of the natural growth; for the skin or bark is remarkably thin, the fibres almost absent, and the flavour greatly superior, being nearly free of the bitterness of the plant when grown in the open air. The value is likewise greatly enhanced, by the stalks being thus ready for use early in the spring, when many of the other delicate vegetables are awanting.

I was led to think of the above method, by some hints given by Mr KNIGHT in the Horticultural Transactions of the London Society; and claim only the slight merit of improving and extending his plan, so that rhubarb-stalks may be raised in any of the winter months. I make no doubt that they may be raised by various methods, in any place where there is heat sufficient to make the plants vegetate; and I hope these hints will excite other persons to make experiments on the forcing of this plant, which has given so much satisfaction at this place this season.

HOPETOUN HOUSE,
June 1. 1821.

Mr Smith having made some improvements in his method of forcing, sent some beautiful specimens to the General Meeting held on 11th March 1824; when the Society's silver medal was unanimously voted to him for devising a simple, effectual, and economical mode of forcing rhubarb. P. N. *Sec.*

Additional Particulars, communicated by Mr Smith, in a letter to the Secretary.

(Read 7th April 1825.*)*

In answer to your letter, requesting me to make any addition I might think proper to my communication dated 1st June 1821, I have to state, that the general plan, specified in that letter, is the same as I use at present, excepting a few improvements made during the course of my practice. The followlng are the principal observations I have made:

1. If the roots are put in for forcing earlier than the last week of December, they generally produce weak stalks.

2. Those put in during the last week of December, produce stalks fit for use in the beginning of February; those put in about the end of January, in little more than a month; those in February, in about three weeks; and gradually in shorter time as the season advances.

3. The stronger the roots are the better. They ought to be kept entire; as, if they are cut in pieces when put into the boxes, they are apt to rot when planted out. They ought not to be kept long in the boxes after they have given over producing stems fit for use, but to be speedily planted out.

4. Any sort of soil may be used, provided it is not too strong. The best is a light sand; or a

mixture of sand and vegetable mould answers very well. It may be made stronger as the season advances, as there is less danger of losing the roots. The reason for mixing the soil with the sand is, that as the roots produce a great quantity of small fibres, which must supply the stems with a good deal of nourishment, they will derive more from a rich soil than from pure sand.

5. If the plants are exposed to much light and air, the stalks come stronger, but are less delicate. On the other hand, if they are perfectly excluded from light, although more delicate, yet they are very weak.

XXXVIII.

REPORT of the Committee of the Caledonian Horticultural Society appointed to try the Home-made Wines, September 1824.

THE Committee appointed to examine the home-made Wines beg leave to report to the Society, that twenty-four different varieties were submitted to them. Among these, several were excellent, and approached so near to each other in quality, that the Committee found it difficult to award the medal. The most perfect wine, however, appearing to them to be that marked "No. 45.," they adjudged the medal to Miss W. M. JOHNSTON, No. 27. James' Square.

The other excellent wines were particularly the following: Five different kinds made by the same person, with the motto, "Se defendendo;" another with the motto, "If you don't like it, don't tell;" and another, with "All is not lost that's in peril;" and the Committee beg leave to suggest,

that it may be expedient to award a separate medal for each of these, not only as an encouragement to the competitors, but as an inducement to others to emulate their example, in cultivating the fruits of this country, and manufacturing carefully the most perfect wines from our own fruits. The two last named wines are intended to imitate Mousseux Champaign, and are excellent of their kind. The Committee would recommend in a particular manner to the Society, the encouragement of this kind of wine, as, by due care, a very palatable and wholesome beverage for summer use, may easily be prepared, at a small expence.

In examining the other wines submitted to them, the Committee observed that several of these wines were not fully fermented, and were much sweeter to the taste, and of a coarser flavour, than wines intended for common use ought to be. These defects arise, in a great measure, from too great a proportion of sugar being originally dissolved in the juice of the fruit and water,—from too strong pressure of the fruit,—sometimes from too much water being added to the juice of the fruit,—often from the fermentation being imperfectly accomplished, or from the liquor not being brought into the truly vinous state, a matter of the greatest importance,—from the fermentation being prematurely stopped by the addition of alcohol,—or lastly, from coarse sugar being em-

ployed in the manufacture of the wine. To remedy these, the Committee would suggest, that less sugar (perhaps in many cases, where the berries are well ripened and saccharine, little more than one-half the quantity usually added) be employed,—that the proportion of pure juice be encreased,—that the finest raw sugar only, or refined sugar, be used,—that the utmost care be taken in bringing the liquor into a perfectly vinous state, to be ascertained by tasting; and that no spirits be added until the following spring, and then, if any, not more than a quart or half a quart to ten gallons of wine.

If the Society shall approve of the suggestion of the Committee to award Extra or Additional Medals, these should be given to Mr W. H. ROBERTS, Kinleith Cottage, Currie, for five kinds of wine, "Se defendendo;" to Mrs STEVENSON, Broompark Cottage, Trinity, "If you don't like it, don't tell;" and to Mrs MACKINLAY, Royal Terrace, "All is not lost that's in peril."

EDINBURGH,
Sept. 1. 1824.

This Report was unanimously approved of by the General Meeting held on 2d September 1824.

P. N. *Sec.*

1. *Receipt for making Wine marked "No. 45."*

To a cask of 24 gallons, wine measure, 40 pints of currants are taken; a few of which are red, the remainder white. The juice is gently squeezed from the fruit, and put into a cask, well mixed with 28 lb. raw sugar, and the whole allowed to ferment for several weeks, the one end of the cask being taken out and covered with a cloth. The liquor is strained off, when the fermentation appears to be subsiding, into a clean cask, which is to be kept full to the bung, by a solution of sugar in water, as long as any hissing noise can be observed. A minute portion of alcohol is now added, and the cask firmly closed up, and placed in a dry situation till the month of July following, when it is fit to be bottled. The wine improves much by keeping.

The cost will be 1s. 7d. per gallon, or about 4d. per bottle, if judiciously managed.—In making wines, particularly sweet wines, it is of the utmost consequence to use a room that is dry, and with a clear free exposure to the atmosphere, as a damp or tainted air is sure to impart its bad qualities to the wine, even, in some degree, though it be inclosed in casks properly secured, and more so to those termed *sweet*.

2. Receipt for making Wines marked "Se defendendo."

I HAVE but one general rule for making every kind of garden wine. I put one-half pound of water to every pound of fruit; bruise them well together, and continue to mix them twice or thrice a-day. I use the Saccharometer, and weigh a small quantity of the liquid after every operation. The increase of gravity is regularly noted down; for as long as saccharine matter is contained in the husks, the gravity will increase. When this is exhausted, a decrease of saccharine matter will be observed by a decreased specific gravity at the next trial, shewing that such matter begins to be decomposed. It is then strained from the husks into a cask without a head, for fermentation; which cask is sufficiently large to contain double the quantity required. The average quantity of sugar I use, is two pounds loaf, powdered fine, to every gallon of impressed juice, put in with the juice in the cask. This fermentation is allowed to continue till it has attenuated 30 or 40 per cent., helping the operation by adding a very small quantity of yeast at the first, and afterwards skimming and stirring it at the least once a-day. It is then transferred into the barrel for final fermentation, (filling it up twice a-day with its own liquor, kept for this purpose), and allowed to remain unbunged till all

visible fermentation has ceased. I again weigh a sample, and find a further attenuation of 10 or 15 per cent. It is then racked from its lees into another cask, and the lees run through a filtering bag. The proportion of spirits used is one-twelfth; put in at three rackings, one-third at each.

With regard to the saccharometer I am of opinion, that if it were in general use, the character of home-made wines would be greatly improved: and that it is impossible, without its aid, to make, from year to year, a regular and well manufactured wine. The seasons in this climate are so precarious, that the fruit in some years will yield, at the least, one quarter more saccharine matter than in others; and by following the generality of receipts, in favourable seasons, we shall have a rich, well-tasted, excellent wine; in others, (although adhering strictly to the same methods), a thin and greatly inferior wine. By using this instrument, we find in bad seasons the deficiency of gravity: in good seasons, the increase. The known evil can be easily remedied by an extra quantity of unadulterated juice, sufficient to bring up the gravity as high as we find by experience is requisite. We all of us, I am convinced, greatly err in using too much sugar; and were we to bring up our gravities by an extra quantity of fruit, sugar might, perhaps, be completely dispensed with. Home-made wines would then in every respect resemble foreign, and be far superior to what they now are.

With regard to the fermentation, I find the greatest advantage from the frequent racking off our wine from the lees, as well to give it an opportunity of fining more effectually, as to restrain in some degree the fermentation, which might otherwise proceed from the vinous to the acetous, and thus produce vinegar instead of wine, which is sometimes the case. Yet the moderate check it receives from the frequent racking, is not sufficient to obtain the desirable attenuation. So long as any portion of the sweet continues to exist, the fermentation will go on; and this I have often experienced after wine has been bottled for many months. The frequent rackings will contribute to the soundness and preservation of the wine, no less than to its clearness and spirituosity.

I have found the average specific gravity of home-made wines, when a twelvemonth old, to be from 30 to 50. Whereas a well manufactured wine will never exceed the weight of water; as is the case with all good foreign wines. The last specific gravity before fermentation I adopt, averages 120 Allan's instrument.

The instrument is expensive certainly when purchased merely for this use; but, if the method appears to you desirable, I have no doubt Mr Allan could make an instrument of glass for 10 or 12 shillings, which would answer the purpose very well, if the use of it were fully explained to him.

3. *Receipt for making Gooseberry Champaign, marked "If you don't like it, don't tell."*

GATHER the gooseberries when full grown, but before they begin to turn ripe; bruise them well, and to one pound of gooseberries put a quart of water; let it stand three days, stirring it frequently; then strain it off, and add to every gallon of liquor three pounds of refined sugar; dissolve it well, and barrel it immediately; put one gallon of spirits, and one ounce of melted isinglass, to a half hogshead of liquor. It should not be bottled for a year. It will be ready for use six or eight months afterwards; but it improves by keeping.

20 pints of Gooseberries,
60 pounds of Sugar,
1 gallon of Spirits,
} to one-half hogshead.

4.—*Receipt for making Green Gooseberry Champaign, marked "All is not lost that's in peril."*

To every pound of green gooseberries, when picked and well bruised, add one quart of spring water; let it stand three days, stirring it well five or six times a-day. To every gallon of this liquor, when strained, add three pounds good loaf sugar;

when that is completely dissolved, barrel it, always keeping the cask full while fermenting; if the situation in which the cask is placed be neither too hot nor too cold, about fourteen days will be sufficient; then add one bottle of French brandy, and half an ounce fine isinglass to every five gallons; bung the cask, and keep it in a cool cellar till the month of March, then bottle it.

N. B.—Pay great attention to the straining, as much depends on this. The gooseberries must be full grown before they turn, and of the smooth sort. Use the best wine corks.

XXXIX.

Notice of an Improved Mode of constructing a Vinery, and of Training the Vines; by which a large additional space for the production of Fruit is obtained, without additional Expence.

By Mr Archibald Reid, Gardener at Balcarras.

In a Letter to the Secretary.

(Read 9th September 1817.*)*

SIR,

In the year 1813, I entered as head-gardener to the Honourable Robert Lindsay of Balcarras. In the Balcarras Garden, I found a vinery of large dimensions, viz. 90 feet long, by 17 feet wide, on the old construction. The vines were then in an unhealthy and unproductive state. I suggested to Mr Lindsay the necessity of some radical change to insure future crops; and he was good enough to allow me to make such alterations, both in the construction of the house, and training of the vines, as I chose.

My first operation was, to reduce the breadth of the house, from 17 to 10 feet; for, owing to the unnecessary breadth of the house, a great quantity of glass was broken annually. This I effected, by removing the front wall, and rebuilding it to the height of 5 feet, at the same time shortening the rafters and sashes to a corresponding width. By this means, at once, a large quantity of glass was saved. In the front wall are a number of small windows, at equal distances, moving on pivots, chiefly for the admission of air to ventilate the house. I also removed the glass partitions and gables, and substituted gables and partitions of brick on edge. On the whole, by these changes, I reckon a saving of 1000 feet of glass and upwards.

I next proceeded to examine the roots of the vines, which I found in a very bad state; for though thirty years old, they still retained the cylindrical and twisted form of the garden flower-pots, from which they had originally been transplanted; and during all that time, they had made few or no fibres or lateral roots. This proves the gross error of planting, without carefully separating, laying out, and distending the roots. The soil about the roots I entirely removed, and replaced it with a composition recommended by the most intelligent gardeners of the present day. The vines were of good kinds, and Mr LINDSAY was desirous to preserve them; but as the contraction of the house left them seven feet beyond the new front

wall, after dressing the plants, removing the outer bark, and all knots and excressences, I conducted them through trenches, pinning them down like layers, and introduced them to the house through small arches or loop-holes in the foundation of the wall. Next year (1814), and the year following (1815), there was a tolerable crop; and some fibres being discovered near the surface of the ground inside, I thought there could be little danger in separating the new roots from the old. I accordingly did so; and the event has justified the experiment. The year immediately after this operation (1816), the crop was trifling: but in the present season (1817), the vines appear in a very healthy and vigorous state, with an excellent crop; and the house is nearly clothed with strong wood.

The new mode of training here recommended, differs from the old, in removing the vines from the glass, and supportiug them on trellis-work of wood, suspended from the rafters on both sides, to the depth of from 3 feet 6 inches, at the offset in front; gradually extending to 5 feet, at the termination on the back wall. The trellis-work is made to bevel out in a small degree, from top to bottom. The sun and light are thus freely admitted to every part of the house equally; the fruit is much improved in size, colour, quantity and flavour, and preserved from the deleterious damps, so destructive to fruit in hot-houses on the old construction. The mode of training here recommended, is well

adapted for creepers in the conservatory or green-house. But the grand advantage consists, in the great additional space gained for the production of fruit, with less fuel, and with a vast saving of glass. One sash being measured, gives 44 square feet. The trellis-work from this sash, (independently of the space on the back wall, which, to a certain extent, may be made available, from the direct influence of the sun, unobstructed by the foliage of the vines), gives 106 square feet, or nearly three times the same dimensions; about 1600 feet of productive space being thereby gained to the house. The inside appearance, too, of the house is greatly improved; instead of a dismal sombre shade, as formerly, it now presents a rich and gay aspect, forming overhead a fine vaulted canopy of lively green. I may add, that it may be made to combine the advantages of a grape-house with those of a pinery during the summer months, so as to give the use of the pine-pit for melons during that period.

I beg leave to add, that I have Mr Lindsay's permission to shew the house, and explain the nature of the alteration, to such as may take an interest in examining it; and so much satisfied is he with the complete success of this experiment, that he has given directions to have his peach-house altered on the same principle *.

Balcarras Garden,
September 1817.

* The peach-house was altered on the same plan, and has given great satisfaction.

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